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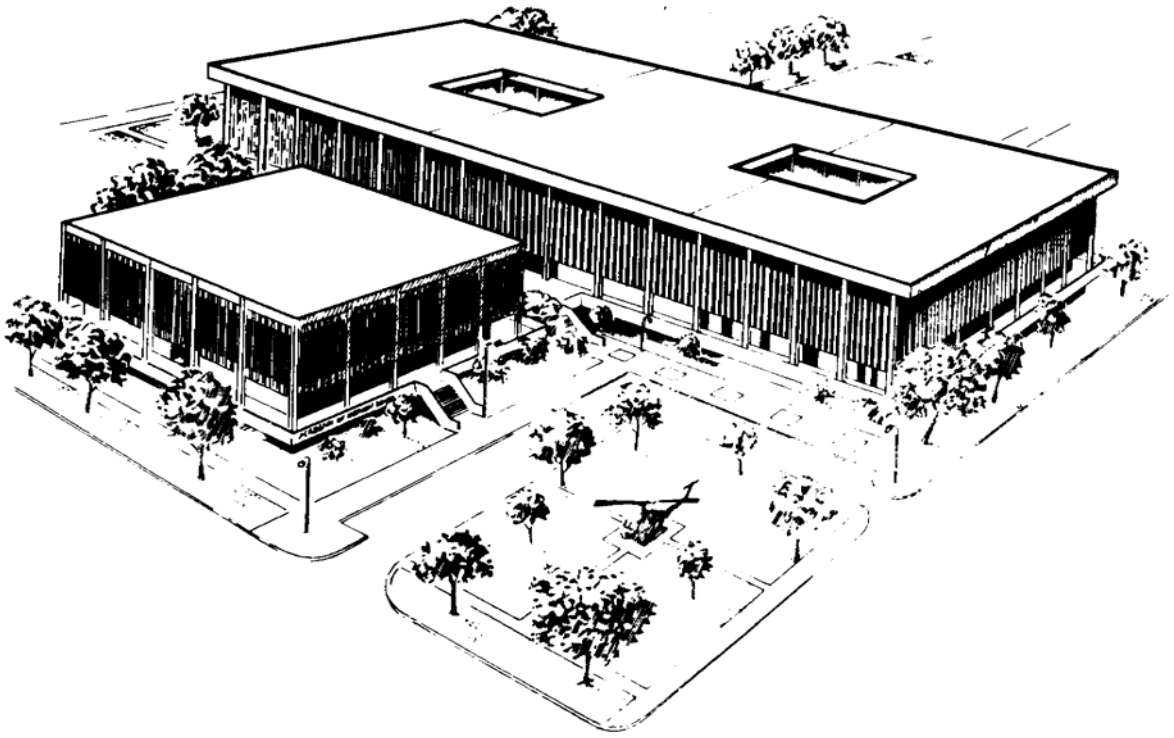
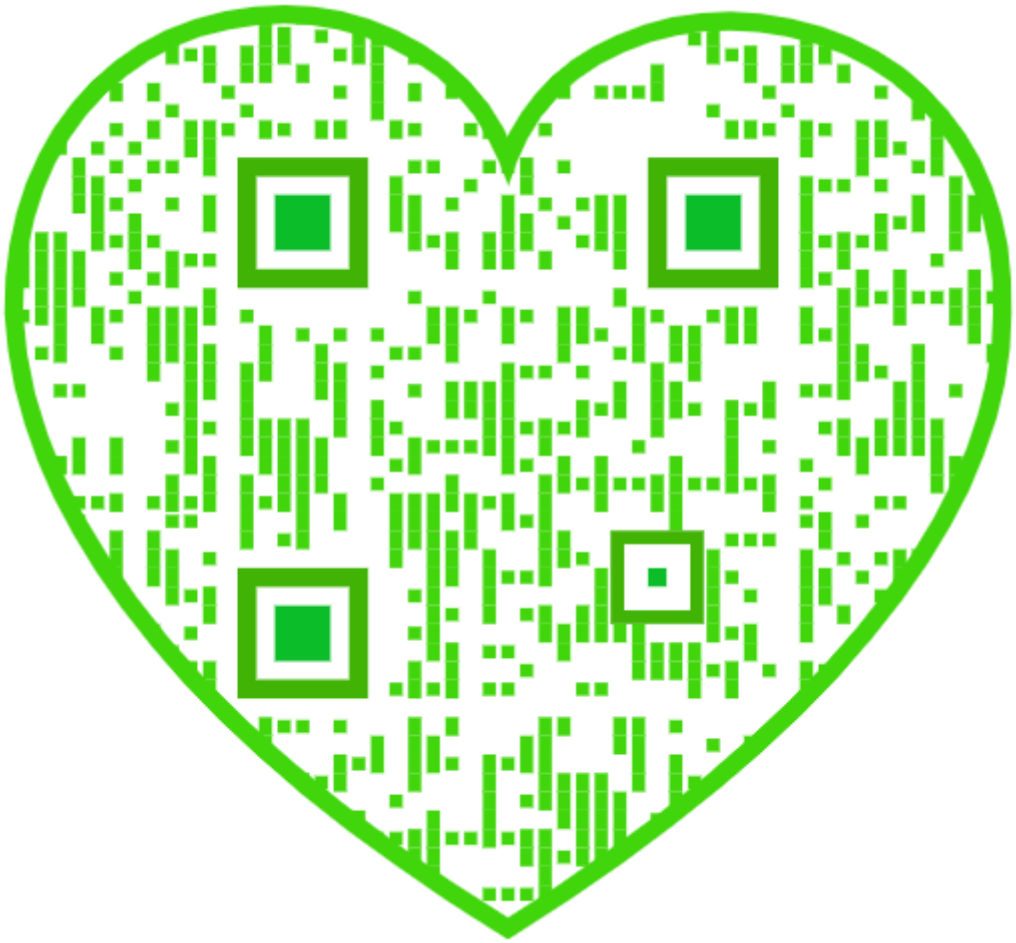


STERILE PROCEDURES

SUBCOURSE MD0540 **EDITION 100**



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CLARIFICATION OF TRAINING LITERATURE TERMINOLOGY

When used in this publication, words such as "he," "him," "his," and "men" are intended to include both the masculine and feminine genders, unless specifically stated otherwise or when obvious in context.
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CORRESPONDENCE COURSE OF THE
U.S. ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL

SUBCOURSE MD0540

STERILE PROCEDURES

INTRODUCTION

A cardinal rule in the medical field is to not do more harm than good to the casualty. This is the reason we must be careful to protect the patient from infection or disease while attempting to treat him. There are times in combat situations when you may not have the time to wash your hands or to wear gloves and mask as you work with the casualty. This is understandable. You must work quickly to help the casualty.

This subcourse discusses communicable diseases and how they are transmitted, medical asepsis, surgical asepsis, the purposes of dressings, types of dressing materials, how to change a sterile dressing, and how to irrigate a wound.

Subcourse Components:

This subcourse consists of five lessons. The lessons are:

Lesson 1. Communicable Diseases

Lesson 2. Medical Asepsis.

Lesson 3. Surgical Asepsis and Sterile Technique.

Lesson 4. Procedures Used in Wound Care.

Lesson 5. Isolation.

Credit Awarded:

To receive credit hours, you must be officially enrolled and complete an examination furnished by the Nonresident Instruction Branch at Fort Sam Houston, Texas. Upon successful completion of the examination for this subcourse, you will be awarded 6 credit hours.

You can enroll by going to the web site http://atrrs.army.mil and enrolling under "Self Development" (School Code 555).

A listing of correspondence courses and subcourses available through the Nonresident Instruction Section is found in Chapter 4 of DA Pamphlet 350-59, Army Correspondence Course Program Catalog. The DA PAM is available at the following website: http://www.usapa.army.mil/pdffiles/p350-59.pdf.

LESSON ASSIGNMENT

LESSON 1	Communicable Diseases.
LESSON ASSIGNMENT	Paragraphs 1-1 through 1-12.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

1-1. Identify the major types of pathogens.

1-2. Identify the types of communicable diseases.

1-3. Identify the procedures to follow to prevent wound infection.

1-4. Identify the body's defense against diseases.

1-5. Identify the signs and symptoms of infection.

1-6. Define the idea of universal precautions.

SUGGESTION After completing the assignment, complete the exercises at the end of the lesson. These exercises will help you to achieve the lesson objectives.

LESSON 1

COMMUNICABLE DISEASES

Section I. REVIEW

1-1. INTRODUCTION

Infections are prone to develop in wounds of violence. Therefore, the prevention and control of infection is one of the chief problems in emergency medical treatment and care of wounded patients. The development of infection, particularly in large wounds, increases the period of morbidity since infection produces further destruction of tissue and suppresses the healing process. Infection also has a marked effect on the final result of the injury and the mortality. Tissues destroyed by infection are usually replaced by scar tissue, which may have a harmful effect on function as well as appearance.

1-2. DEFINITIONS

Some of the terms related to infection are defined below:

a. **Antibiotic.** An antibiotic is a substance produced by microorganisms, which kills bacteria and other microorganisms. It is used in treating infectious diseases.

b. **Antiseptic.** An antiseptic is an agent that may kill pathogens, but more often retards their growth.

c. **Aseptic.** Aseptic is a state of being sterile (free from septic material).

d. **Contaminated.** Contaminated means compromised by the presence of bacteria or harboring pathogenic agents.

e. **Infection.** An infection is produced by an invasion of disease-producing pathogens which multiple in the body.

f. **Malaise.** Malaise means body discomfort.

g. **Morbidity.** Morbidity refers to the condition of being diseased or to the ratio of sick to well persons. This is not to be confused with mortality, which is the death rate.

h. **Pathogen.** A pathogen is a disease-producing organism.

i. **Phagocyte.** A phagocyte is a form of leukocyte (white blood cell) that ingests microorganisms or other cells.

j. **Septic.** Septic refers to something that is affected by pathogens, their toxins, or to something putrid.

k. **Septicemia.** Septicemia refers to the widespread distribution of infective bacteria through the bloodstream. It is also called "blood poisoning."

l. **Sterile.** Sterile means free from live pathogens and other live microorganisms.

1-3. CLASSIFICATION OF PATHOGENS

a. **Infectious Agents.** Infectious (pathogenic) agents of one kind or another are everywhere that life exists. They inhabit the air, soil, and water. In the body of humans and animals, they inhabit waste products, skin, respiratory tracts, and alimentary tracts. Agents capable of harming man include bacteria, viruses, and fungi. The primary basis for the development of infection is the growth of bacteria within the wound itself. All injuries in which the skin has been penetrated are contaminated by bacteria. Following are some of the types of pathogens.

(1) Bacteria. Bacteria are microscopic one-celled plant organisms. The group names sometimes describe the infection. The most common are named below.

(a) A staphylococcus is a pyogenic (pus-producing), spherical-shaped form of bacteria. It is the most common cause of localized infection in which pus is present.

(b) Streptococcus is also a pyogenic, spherical-shaped form of bacteria.

(c) Bacilli is a term applied to rod-shaped bacteria.

(2) Viruses. Most viruses are very small microscopic protein bodies. They are neither plant nor animal. Viruses are capable of multiplying only in the presence of living cells and are normally separated into subgroups according to the type of host they infect--bacterial viruses, animal viruses, and plant viruses.

(3) Fungi. Fungi are a low order of plant life that lack chlorophyll, such as toadstools, yeast, and molds. An example of a condition caused by a fungus is athlete's foot (tinea pedis).

b. **Development of Infection.** Bacteria multiply and increase in numbers very rapidly; however, wounds of less than 4 hours old are considered to contain bacteria that have not begun to grow. Those wounds from 4 to 8 hours old are known to contain bacteria that are actively growing in the tissues on the surface or in the depths of the wound. In injuries more than 8 hours old, the bacteria have usually invaded adjacent

tissue and may have invaded along the lymphatics or the bloodstream. The infectious agents not only multiply rapidly and invade adjacent tissue, but they also give off poisonous products called toxins.

(1) Surface. Local infection confined to immediate tissue of the wound is considered to be surface infection.

(2) Regional. Infection that spreads along the lymphatics is considered as regional.

(3) Systemic. If the invasion is by way of the bloodstream, it is systemic infection.

1-4. COMMUNICABLE DISEASES

A communicable disease is an illness that can be transmitted from one person to another person, from an animal to a person, or from a person to an animal. Communicable diseases can be divided into the following five groups.

a. **Respiratory Diseases.** Respiratory diseases are usually transmitted from person to person by discharges from the nose, mouth, throat, or lungs of an infected person. Examples of communicable respiratory diseases include the common cold, influenza (flu), pneumonia, streptococcal throat infection (strep), and tuberculosis (TB).

b. **Intestinal Diseases.** Intestinal diseases are usually transmitted by food or water that is contaminated by the feces or urine of an infected person or animal. Examples of communicable intestinal diseases include typhoid, cholera, and dysentery.

c. **Insect-Borne Diseases.** Insect-borne diseases are transmitted from a person to another person or from an animal to a person by insects. Examples of communicable insect-borne diseases include malaria (transmitted by mosquitoes), yellow fever (transmitted by mosquitoes), typhus (transmitted by lice), Rocky Mountain spotted fever (transmitted by ticks), and plague (transmitted by fleas). Ticks and mites are not true insects, but are generally called insects because of their resemblance to true insects.

d. **Sexually Transmitted Diseases.** These diseases are usually transmitted from person to person by sexual intercourse. Examples include syphilis, gonorrhea (clap), and chancroid.

e. **Bloodborne Diseases.** For more on such diseases as human immunodeficiency virus (HIV) and hepatitis B virus (HBV) and how to protect yourself against them, see Section III of this lesson.

f. **Miscellaneous Diseases.** Miscellaneous communicable diseases consist of communicable diseases that do not fall into any of the other five groups. Diseases such as tetanus (lockjaw) and rabies fall into this group.

Section II. PREVENTION AND CONTROL OF INFECTION

1-5. PREVENTION OF WOUND INFECTION

Steps to prevent wound infection must be taken by each person who renders aid, care, or treatment to the casualty. Although all combat wounds are contaminated by their nature, the following precautions can be taken to avoid converting contaminated wounds to infected wounds and to minimize the occurrence of wound infections.

a. **Sterile Dressing.** The application of a sterile dressing over the wound will lessen the chance of contamination becoming infection.

b. **Clean Hands.** Persons giving direct care and treatment to patients should wash their hands in soap and water or rinse hands in antiseptic. Hands contaminated with blood, vomitus, mucus, urine, or feces should be thoroughly scrubbed before providing care and treatment.

c. **Clean Wound.**

(1) Minor cuts and bruises may be scrubbed vigorously with soap and water and dried with sterile cotton before dressings are applied.

(2) If an antiseptic is immediately available, it may be applied around a superficial wound when hemorrhage is not severe and when surgery is expected to be delayed for more than six hours after the injury occurred.

(a) When applying antiseptic around a wound, use a sterile cotton swab. Start at the wound edge and apply the antiseptic away from the wound. Do not retrace.

(b) Do not put antiseptic into the wound nor permit it to drain into the wound.

(c) Do not remove or loosen a dressing to apply antiseptic around the area of the wound.

(d) Do not touch the antiseptic supply with a used swab or anything else not sterile.

(e) Do not breathe, cough, or sneeze on wounds or sterile items.

d. **Precautions.** Avoid causing further injury and prevent chilling, exposure, fatigue, and other factors which lessen the body's resistance.

e. **Medication.** Antibiotics and tetanus toxoid, if needed, are usually administered at the aid station.

1-6. BODY DEFENSES

The body incorporates certain defenses against the invasion of pathogens causing infection.

a. **Skin.** The skin is the first line of defense since most pathogens cannot enter unbroken skin.

b. **Phagocyte.** Another line of defense is phagocyte cells such as white blood cells. These cells engulf pathogens and absorb them. Phagocytes increase in numbers at the site of infection.

c. **Immune Substances.** Still another line of defense is the development by the body of antibodies and antitoxins. Because pathogens are foreign substances, the body reacts and destroys them by producing immune bodies. All patients vulnerable to gross infection or infectious diseases, particularly tetanus, should receive indicated prophylactic doses of antibiotics and immunizing agents.

d. **Lymphatic System.** The lymphatic system also defends the body against invading pathogens. The lymph acts like a washing machine for the body. It cleanses the body tissues. Lymph flows into the tubules and glands that act as filters and strains the invaders.

e. **Factors Which Lesson Body Defenses.** Several factors that may be present in combat casualties tend to lessen body defenses. They include wound injuries, chilling, exposure, fatigue, and malnutrition.

1-7. SIGNS AND SYMPTOMS OF INFECTION

Inflammation is a purposeful reaction of tissue to injury. If it develops in the absence of pathogens, it is called a sterile inflammation. When produced by pathogens, it is called septic.

a. **Changes in Tissue Caused by Inflammation.** The changes induced in infected tissues by inflammation consist of heat, redness, swelling, sensitivity, tenderness, and pain. In addition, red streaks radiating from the affected area may be present as well as pus formation, usually in the center of the infection. Malaise, headache, and fever may also be present.

b. **Sepsis.** If the infectious process cannot be localized in the wound area by the body's defenses, it eventually spreads so that a generalized septic condition or septicemia develops. This may result in shock that can lead to death.

1-8. CYCLE OF INFECTION

Prevention and control of infection is of vital importance to the patient as well as to health care personnel. In order to provide proper care for patients with communicable diseases or infectious organisms, you should understand the components of infection and the methods to control the cycle of infection. The cycle of infection (see figure 1-1) is like a chain consisting of six links. To produce disease, each link of the infectious process must be present in a logical sequence. Removing one link in the chain will control the cycle of infection. The six links are discussed in the following paragraphs.

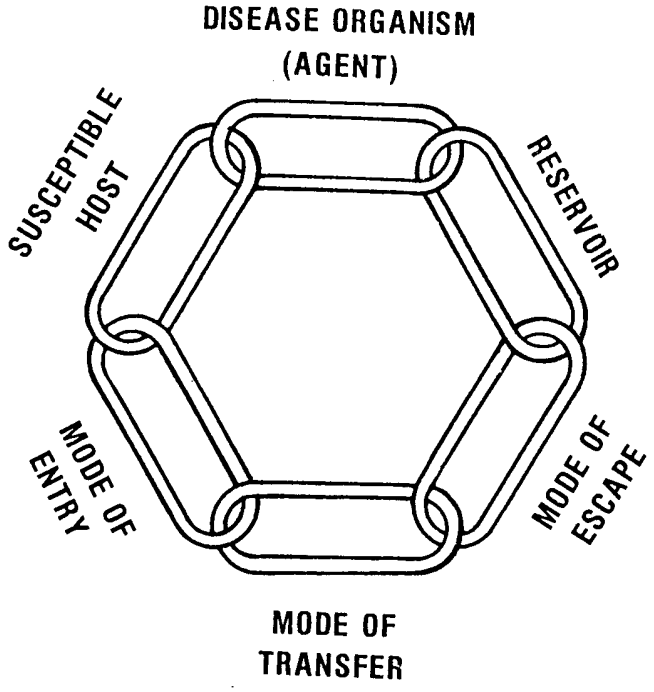

Figure 1-1. The cycle of infection.

a. **Infectious Microorganisms (Agent).** These are the pathogens that cause communicable diseases.

b. **Reservoir.** The reservoir (source) is the person or animal that has the disease. Sometimes a person may have a disease but is not ill. This type of person is called a carrier. The carrier known as Typhoid Mary is a classic example. She was a food worker in a restaurant who spread the disease typhoid by contaminating the foods she handled. Other examples of reservoirs are a person with a common cold, a person with malaria, a person with syphilis, a rat with plague, and a bat with rabies.

c. **Mode of Escape.** This refers to the route by which the infectious microorganisms escape the reservoir. For example, pathogens that cause respiratory diseases usually escape through the respiratory tract (coughing, sneezing, and so forth) Modes of escape and methods of controlling the mode (preventing the escape) are shown in figure 1-2.

MODES OF ESCAPE	CONTROL
Respiratory Tract. Microorganisms leave the body of the infected person by means of droplets exhaled as a spray in coughing, sneezing, talking, or just breathing. Microorganisms also escape in nose and throat secretions.	(1) Wear a mask. (2) Do not talk directly into patient's face. (3) If you have an upper respiratory disease, such as a cold, do not work around patients.
Gastrointestinal Tract. Microorganisms that leave the body of the infected person by means of body secretions, for example, hepatitis, the virus is shed in the stool of the infected person.	(1) Handle body secretions properly. (2) Perform patient care handwash.
Skin. Microorganisms that leave the body of the infected person by wound drainage or through skin lesions	(1) Dispose of wound dressings properly. (2) Perform patient care handwash.

Figure 1-2. Modes of escape and their control.

d. **Vector.** The vector is the connection between the source of the disease (reservoir) and the person who is going to catch the disease (host). The vector is sometimes referred to as the "vehicle of disease transmission." Vectors and their control are discussed in figure 1-3.

VECTORS (MODES OF TRANSFER)	CONTROL
Contact (Direct Transfer). Physical contact with an infected person or items contaminated by an infected person, e.g., syphilis and wound drainage.	(1) Perform patient care handwash. (2) Avoid direct contact with wound drainage. (3) Wear a mask.
Indirect Contact (Airborne Transfer). Inhalation of droplets or dust particles contaminated with infectious agents from coughs and sneezes.	Wear a mask.
Insects. Transmittal of pathogens through arthropods such as flies, mosquitos, and ticks that bite infected persons causing such diseases as malaria and yellow fever.	Proper control of disease-carrying insects.
Food and Water. Through consumption of improperly cooked pork or poultry, contaminated raw fish, or water contaminated with feces, urine, or other infectious material.	Maintain high standards of-- (1) Mess sanitation. (2) Water purification. (3) Selection and preparation of food.
Fomites. These are articles contaminated with microorganisms from infected persons or animals. Some examples are surgical instruments, bed linen, and eating utensils.	(1) Wash linen. (2) Use sterilized equipment for surgical procedures. (3) Sanitize eating utensils.

Figure 1-3. Vectors and their control

e. **Mode of Entry.** The mode of entry refers to the method by which the pathogens enter the person (host). For example, some pathogens are inhaled (respiratory tract). Ways of controlling modes of entry are shown in figure 1-4.

MODES OF ENTRY	CONTROL
Respiratory Tract. Small residues (droplet nuclei) that result from evaporation of droplets from the respiratory tract of infected persons remain suspended in the air of poorly ventilated spaces for relatively long periods of time. The infectious microorganisms can be inhaled by a well person who may then become infected with the disease.	Wear a mask.
Gastrointestinal Tract. Pathogenic microorganisms enter the body of new host when food or water contaminated by feces is ingested.	Dispose of body excretions carefully.
Skin. Pathogenic microorganisms enter the body when a person comes into contact with wound drainage or skin secretions.	Dispose of wound dressings carefully.

Figure 1-4. Modes of entry and their control.

f. **Susceptible Host.** The host is the person who gets the disease. Once the host has the disease, he becomes a reservoir for future transmission of the disease. A listing of the most susceptible persons to disease and some control measures are shown in figure 1-5.

SUSCEPTIBLE HOSTS	CONTROL
Children who are very young. People who are very old. People on inadequate diets. People who are chronically ill. People receiving medical therapy. People who are already ill. People with open wounds.	(1) Separate high risk persons from persons with known or potential infections. (2) Provide nutritional supplements to persons on inadequate diets. (3) Vaccinate against certain types of diseases. (4) Maintain proper sanitation.

Figure 1-5. Susceptible hosts and control measures.

Section III. BLOODBORNE PATHOGENS

1-9. HEALTH CARE WORKERS AT RISK

According to Occupational Safety and Health Administration (OSHA) estimates, approximately 5.6 million workers in health care and other facilities are at risk of exposure to bloodborne pathogens such as the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and other potentially infectious materials (OPIM).

a. Those workers who have occupational exposure to bloodborne pathogens include, but are not limited to: nurses, physicians, dentists and dental workers, laboratory and blood bank technologists and technicians, medical examiners, morticians, phlebotomists, emergency room personnel, orderlies, housekeeping personnel, laundry workers, and military medics.

b. Others also at risk include law enforcement personnel, firefighters, paramedics, emergency medical technicians, and anyone else whose job might require providing first-response medical care in which there is a reasonable expectation of contact with blood or OPIM.

1-10. DEFINITIONS

a. **Bloodborne Pathogens.** Pathologic microorganisms that are present in human blood and can cause disease in humans. The term blood includes whole blood, blood components, and products made from human blood.

b. **Body Fluids.** Fluids that have been recognized by the Centers for Disease Control as directly linked to the transmission of HIV, HBV, and to which universal precautions apply are blood, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pericardial and amniotic fluids, and concentrated HIV or HBV viruses. Body fluids are also referred to as OPIM.

1-11. BLOODBORNE PATHOGENS: HUMAN IMMUNODEFICIENCY VIRUS AND HEPATITIS B VIRUS

a. **Epidemiology.**

(1) Approximately eight to ten million persons are thought to be infected with HIV world-wide. The incubation period is still unknown. Early symptoms are fatigue, low-grade fever, and general malaise.

(2) Less than five percent of the United States (US) population is reported to be HBV positive. The incubation period is usually 60--90 days with a range of 30--180 days; however, some cases have been reported ten years after initial exposure. HBV may be asymptomatic, detected through serologic tests. Early symptoms may be flu-like, nausea and vomiting, fatigue, and mild liver enlargement. Late symptoms include darkening urine, light-colored stool, jaundice, anorexia, and itching.

b. **Transmission.**

(1) For soldiers working in the health care environment, the most common means of exposure to bloodborne pathogens is through accidental needle-stick with contaminated blood or other body fluids.

(2) The second most common means of exposure in the workplace is contact by an open wound or non-intact skin (chapped or abraded skin) of a health care worker to contaminated blood, other body fluids, or concentrated virus.

(3) In the community, the most common means of transmission of HIV and HBV is through contaminated body fluids during sexual activity, especially semen and vaginal secretions.

c. **Prevention.**

(1) Universal precautions prevent health care workers from coming into contact with blood and other body fluids of patients. These precautions are methods of infection control in which all human blood and certain body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens. If there is any doubt, all body fluids are to be considered potentially infectious.

(2) There is a Hepatitis B vaccination available to all health care providers who have occupational exposure to bloodborne pathogens. Vaccinations consist of a series of three inoculations over a six-month period. The vaccine is safe and effective, and it protects for up to five to seven years after the first inoculation.

1-12. UNIVERSAL PRECAUTIONS

a. **Work Practices Controls.**

(1) All containers used as receptacles for regulated waste, contaminated sharps (objects that can penetrate the skin), contaminated laundry, or other containers used to store, transport, or ship blood or OPIM are labeled with the biohazard label (see figyre 1-6).

Figure 1-6. Biohazard label.

(2) Red bags or red rigid containers may be used as a substitute for the biohazard label when applicable.

(3) Needles must be disposed of into approved sharps containers without being broken or bent.

b. **Personal Protective Equipment.**

Known as PPE, this means specialized clothing or equipment worn for protection from exposure to blood or OPIM.

(1) Disposable gloves, gowns, masks, airway shields, etc.

(2) Biohazard bags.

(3) Disinfectant soap.

(4) Goggles, glasses, or face shields.

c. **Exposure Occurrence.**

(1) An exposure incident is specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or OPIM that results from the performance of soldiers' duties.

(2) If such an incident occurs, follow the guidance of your local Exposure Control Plan. Your hospital or your unit will have such a plan. For more information about the OSHA plan, see OSHA Bloodborne Pathogens Exposure Control Plan.

Continue with Exercises

EXERCISES, LESSON 1

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise. After you have completed all of these exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. Bacilli is an example of a group of one-celled plants called _____ that can cause infection.

   a. Bacteria.

   b. Fungi.

   c. Staphylococcus.

   d. Viruses.

2. Communicable diseases that are spread by coughing and sneezing are called:

   a. Insect-borne diseases.

   b. Intestinal diseases.

   c. Miscellaneous diseases.

   d. Respiratory diseases.

3. Ensuring a supply of purified water is especially important in controlling:

   a. Insect-borne diseases.

   b. Intestinal diseases.

   c. Respiratory diseases.

   d. Sexually transmitted diseases.

4. An example of a disease that is normally transmitted by food, which has come into contact with fecal material from an infected food handler is:

   a. Tetanus.

   b. Tuberculosis.

   c. Typhoid.

   d. Typhus.

5. Which of the following defends the body against infection by preventing pathogens from entering the body?

   a. Antibiotics.

   b. Antibodies.

   c. Lymphatic system.

   d. Skin.

6. Which one of the following is a sign of infection?

   a. Skin is cool to the touch.

   b. Swollen tissue.

   c. Numbness.

   d. Skin has blue tint.

7. The means by which a disease is transmitted is called the:

   a. Host.

   b. Infection.

   c. Reservoir.

   d. Vector.

8. The purpose of universal precautions is to protect:

   a. Patients.

   b. Animals.

   c. Health care workers.

   d. The local community.

9. There is now a Hepatitis B vaccine.

   a. Yes.

   b. No.

10. Red bags or red rigid containers may be used as a substitute for the biohazard label when applicable.

   a. Yes.

   b. No.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 1

1. a (para 1-3a(1)(c))
2. d (para 1-4a)
3. b (para 1-4b; fig 1-3)
4. c (para 1-4b)
5. d (para 1-6a)
6. b (para 1-7a)
7. d (para 1-8d)
8. c (para 1-11c(1))
9. a (para 1-11c(2))
10. a (para 1-12a(2))

End of Lesson 1

LESSON ASSIGNMENT

LESSON 2	Medical Asepsis.
LESSON ASSIGNMENT	Paragraphs 2-1 through 2-5.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

2-1. Identify the meaning of aseptic technique.

2-2. Identify the measures treatment personnel can use to carry out aseptic technique.

2-3. Distinguish between medical and surgical aseptic technique.

2-4. Distinguish between sterilization and disinfection.

2-5. Identify the various types of chemical disinfectants, antiseptics, and cleaning agents and their uses.

2-6. Identify the steps used in medical asepsis.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you achieve the lesson objectives.

LESSON 2

MEDICAL ASEPSIS

2-1. GENERAL

Asepsis is the condition of being free from disease-producing microorganisms. Aseptic technique implies all those procedures that reduce or eliminate pathogens and their actions or minimize their areas of existence. Confusion sometimes results from erroneously thinking that medical asepsis and surgical asepsis are the same except one is used on a medical ward and the other is used in a surgical ward. This is not so. Some of the differences between medical aseptic technique and surgical aseptic technique are listed below.

a. **Definitions.**

(1) Medical asepsis. All of the procedures used to protect the patient and his environment from the spread of infectious organisms.

(2) Surgical asepsis. All of the procedures used to sterilize and to keep sterile any objects or articles that are to be introduced into a wound or body cavity or that is to penetrate the skin.

b. **Emphasis.**

(1) Medical asepsis. Cleanliness (freedom from most pathogenic organisms).

(2) Surgical asepsis. Sterility (freedom from all microorganisms).

c. **Purpose.**

(1) Medical asepsis. To reduce the transmission of pathogenic organisms from patient to another person.

(2) Surgical asepsis. To prevent introduction of any organism into an open wound on the patient or into a body cavity.

d. **Isolation.**

(1) Medical asepsis. Patients with a communicable disease are separated from the rest of the patients by room, ward, or unit.

(2) Surgical asepsis. Patients requiring surgery are taken to the operating room of the hospital.

e. **Zone.**

(1) Medical asepsis. A zone about the isolation unit is established as contaminated. Everything within the zone of isolation is contaminated. Nothing goes out of the zone without being disinfected or wrapped in a clean cover to permit handling in a clean zone.

(2) Surgical asepsis. A zone about the site of operation or wound is established as a sterile field. Once a sterile article touches an unsterile article, it is contaminated (unsterile). Only sterile articles are brought into the sterile field.

f. **Handwashing.**

(1) Medical asepsis. Hands and forearms are washed for 1 to 2 minutes to remove surface contaminants and soil. Hands and arms are dried with paper towels.

(2) Surgical asepsis. Hands and forearms are scrubbed for 10 minutes to reduce the bacterial count on the skin surface. Hands and arms are dried with a sterile towel.

g. **Gowns.**

(1) Medical asepsis. Clean gowns are worn to protect the worker. Inside of gown is clean; outside of gown in contact with patient and his environment is contaminated.

(2) Surgical asepsis. Sterile gowns are worn to protect the patient from the worker. Outside of gown that is in contact with the sterile field must be kept sterile.

h. **Status of Patient.**

(1) Medical asepsis. Reservoir of infection.

(2) Surgical asepsis. Potential host (other people and environment are reservoirs of infection).

i. **Goals.**

(1) Medical asepsis. Confine disease organisms and prevent spread to others.

(2) Surgical asepsis. Reduce number of organisms and prevent spread of infection to others.

2-2. ASEPTIC TECHNIQUE

a. Aseptic technique is a discipline that consists of a series of events to guard the patient against infection. This procedure is used to reduce the direct or indirect transfer of germs to any surface, article, or person.

(1) With traumatic wounds, which are assumed to be contaminated beforehand, aseptic technique refers to applying a dressing in a manner so that additional contamination is not induced.

(2) In administration of preparations by injection or infusion, it refers to measures designed to prevent or minimize introduction of pathogens beneath the skin.

(3) In surgery, it normally implies sterile conditions in and around the patient area.

b. Treatment personnel can carry out aseptic technique by:

(1) Keeping their hands clean and as free from contamination as possible.

(2) Ensuring that all sterile items are kept free from all organisms. (Dressings that are to be applied to wounds, needles, and instruments to be inserted through the skin, and syringes to be filled for injection into the body must not touch anything unsterile before being used.)

(3) Keeping from breathing, coughing, or sneezing on wounds or sterile items.

2-3. STERILIZATION

Microorganisms (including bacteria, spores, and viruses) can be completely destroyed through the process of sterilization. Surgical instruments, dressings, and certain other items are sterile and remain so until individual packages or seals are penetrated and contaminants are admitted. Sterilization normally is accomplished by use of heat, preferably moist heat under pressure such as is used in an autoclave.

2-4. DISINFECTION

Disinfectants are used as a means for destroying harmful organisms with the exception of the spore forms of bacteria. In the emergency medical treatment situation, the spore-forming organisms of importance are those that cause tetanus and gas gangrene. Tetanus, in the absence of preventive antitetanus inoculation, and gas gangrene are serious infections which threaten wounded patients, especially those with deep, dirty wounds in which oxygen supply is very limited.

a. **Boiling.** Boiling is considered only when saturated steam under pressure (autoclave) is not available. Articles should be well cleaned before boiling and then must be totally immersed, with surfaces opened to the solution, for 30 minutes of vigorous boiling. Needles, metal cannulas, surgical instruments, glassware (including hypodermic syringes), and similar items may be boiled. Rubber goods may not be boiled.

b. **Chemical Disinfectants.** Various chemical preparations are effective as disinfectants. Chemical disinfectants in common use today include Cidex, Wescodyne, isopropyl alcohol 70 percent, and certain phenol preparations specifically designed as disinfecting solutions for inanimate objects. Materials not harmed by water will not be harmed by disinfectant solutions of these chemicals. Use of liquid chemical disinfectant should be severely limited to those occasions when saturated steam under pressure (autoclave) is not available or when steam sterilization would damage articles so processed.

(1) Instruments and supplies not adversely affected by the chemicals may be disinfected by immersion in a solution of chemical disinfectants for the time specified by the label on the container, by established procedure such as that of a hospital or aid station, or by a person having knowledge of the disinfecting properties of the various chemical solutions.

(2) When the articles have been disinfected, the treated articles must be flushed well with sterile normal saline and dried before being used on the patient. Except for alcohol (isopropyl 70 percent), chemicals of disinfecting strength are not applied to the patient since they could damage the patient's skin.

c. **Antiseptics.** Antiseptics interfere with the growth and development of pathogens without necessarily destroying these agents. Antiseptics are milder than chemical disinfectants, either by nature or by strength, and may be applied directly to patients. Antiseptics included in your aid kit are povidone-iodine topical solution and ointment, surgical detergent 7 1/2 percent povidone, and isopropyl alcohol 70 percent. If immediately available, an antiseptic solution may be applied around a superficial wound when hemorrhage is not severe and when surgery, if indicated, is expected to be delayed longer than six hours after wounding.

d. **Cleansing Agents.** Cleansing or skin degerming agents may include soap and water or surgical detergent preparation and water. Mixtures of soaps or skin detergents, with or without antiseptic properties, mechanically bind dirt, grime, and pathogens that are then floated away with rinse water.

NOTE: Only disinfectants, antiseptics, and detergents approved by the Infection Control Committee (or other similar group on the local level) should be used.

2-5. PROCEDURE FOR APPLYING MEDICAL ASEPSIS

Hospital-acquired (nosocomial) infections and cross infections (infections that are transmitted between individuals with different pathogens) show the need of applying basic principles of medical asepsis. The following steps outline the basic procedures used in applying medical asepsis.

a. **Perform Patient Care Handwash.** Follow previous instruction on patient care handwash. The patient care handwash is the most important step in preventing and controlling infection. There may be times when you do not have the materials or the time to do a thorough handwash; however, always wash your hands and clean your fingernails if time permits.

b. **Disinfect Materials as Required.** Disinfecting means cleaning objects to remove most organisms. Follow directions explicitly where chemical agents are used.

c. **Maintain Clean Patient Care Environment.**

(1) Concurrent cleaning. Disinfect and dispose of infectious matter immediately during the course of a disease. This is a constant task.

(2) Terminal cleaning. Disinfect contaminated materials after a patient dies, transfers, or is discharged.

(a) Use freshly prepared germicidal detergent solution to wash furniture, mattress covers, grossly soiled areas of walls, and equipment not handled by central supply.

(b) Wet-vacuum or mop floors.

(c) If an isolation room, read isolation technique sign for special instruction.

d. **Use Clean and Dirty Utility Rooms.** Clean and dirty articles are not stored in the same place in order to prevent contamination. Clean rooms are used to store clean, unused equipment. Dirty rooms are rooms used to store contaminated items such as used linen, trash, contaminated equipment, dirty dietary trays, and basic laboratory tests.

e. **Store and Handle Linen Properly.**

(1) Clean linen. Store clean linen in a clean room marked for clean linen only. Prevent the contamination of clean linen by:

(a) Limiting access to authorized personnel only.

(b) Washing hands before handling clean linen.

(c) Keeping linen from touching floor or any other known dirty surface.

(d) Keeping linen from touching uniform.

(2) Dirty or soiled linen. Dirty linen is linen that has been used and maybe contaminated with blood, urine, feces, and so forth. Store dirty linen in the "dirty" utility room. Prevent the spread of contamination by following these rules.

(a) Do not shake or toss dirty linens.

(b) Do not allow uniforms to come into contact with dirty linens.

(c) Remove dirty linen from the area using procedures established by local standing operating procedures (SOP).

f. **Store and Handle Equipment and Supplies Properly.**

(1) Store clean and dirty equipment and supplies in separate areas.

(2) Cleanse dirty equipment thoroughly before placing with clean equipment for reuse by another patient.

(3) Use disposable equipment whenever possible.

(4) Use separate disposable items for each patient.

g. **Dispose of Waste Materials.**

(1) Uncontaminated trash. Uncontaminated trash results from normal living routine of patients. Uncontaminated trash requires no special handling. Remove all unconsumed food items from patient care areas as soon as possible after patients have finished eating.

(2) Contaminated trash. Contaminated trash results from contamination with bodily secretions and/or excretions of the patient. Contaminated trash requires special handling.

(a) Seal each bag according to local SOP before removing from patient's bedside.

(b) Place each bag in specific area or container designated and labeled "contaminated trash."

(c) Remove each bag from the ward or clinic frequently according to the local SOP.

(3) Excretions.

(a) Clean bedpans and urinals after each use.

(b) Flush away all contents promptly unless specimens are required.

(c) Cover the bedpan or urinal with paper cover when it is necessary to carry it from the patient's room to another area.

h. **Follow Specific Isolation Techniques for Patients with Communicable Diseases.** See Lesson 5 of this subcourse for instruction on isolation techniques. For a brief description of some selected communicable diseases along with pertinent points in health care, see FM 8-33, Control of Communicable Diseases in Man, an official report of the American Public Health Association.

i. **Other Considerations.**

(1) Standing liquids (including medications). Time, date, and label all standing liquids at time of change. Standing liquids should be changed every 24 hours unless otherwise directed.

(2) Refrigerators. Clean and check temperature of refrigerators according to the local SOP. Contents should be labeled and dated.

Continue with Exercises

EXERCISES, LESSON 2

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise. After you have completed all of these exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. A person says that medical and surgical aseptic techniques refer to the same procedures used in two separate locations. Is this correct?

   a. Yes.

   b. No.

2. Which one of the following is true of surgical aseptic technique rather than medical aseptic technique?

   a. A patient with a communicable respiratory disease is put in a ward containing other patients having the same disease.

   b. Surgery is performed in a special room that is located away from nonsurgical patients.

   c. Hands and arms are dried with a clean paper towel after the handwash is performed.

   d. The inside of the worker's gown is clean while the outside is considered to be contaminated.

3. The procedures employed to reduce or eliminate disease-causing organisms or their action or to minimize the area where disease-causing organisms exist in order to protect against infection are called:

   a. Aseptic techniques.

   b. Isolation procedures.

   c. Sanitary techniques.

   d. Zone procedures.

4. A process that kills bacteria spores is:

   a. Boiling.

   b. Disinfection.

   c. Isolation.

   d. Sterilization.

5. An agent that removes disease-causing organisms by loosening and removing the dirt and grime to which the organisms are attached is called a/an:

   a. Antiseptic agent.

   b. Chemical disinfectant.

   c. Cleansing agent.

   d. Sterilizing agent.

6. Which one of the following is a proper procedure for maintaining medical asepsis?

   a. Perform terminal cleaning procedures in each patient's area at the end of each day.

   b. Clean bedpans and urinals once each day.

   c. Seal contaminated trash in a bag before removing the trash from the patient care area.

   d. Clean disposable equipment after it is used by one patient before using it again for another patient.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 2

1. b (para 2-1)
2. b (para 2-1d)
3. a (paras 2-1, 2-2)
4. d (paras 2-3, 2-4)
5. c (para 2-4d)
6. c (para 2-5g(2)(a))

End of Lesson 2

LESSON ASSIGNMENT

LESSON 3	Surgical Asepsis and Sterile Technique.
LESSON ASSIGNMENT	Paragraphs 3-1 through 3-8.
TASK TAUGHT	081-833-0007, Establish and Maintain a Sterile Field.
LESSON OBJECTIVES	After completing this lesson, you should be able to: 3-1. Identify the basic principles for using sterile materials. 3-2. Identify the basic steps in sterile technique. 3-3. Identify the basic procedures for setting up a sterile field.
SUGGESTION	After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you achieve the lesson objectives.

LESSON 3

SURGICAL ASEPSIS AND STERILE TECHNIQUE

3-1. PRINCIPLES OF STERILE TECHNIQUE

Sterile technique refers to the way sterile materials are handled in order to keep them free of living microorganisms (germs). Sterile technique prevents contamination. Sterile technique is needed in any procedure involving contact with an open wound, breaking skin or mucous membrane, or entrance into a normally sterile body cavity. In the controlled setting of the operating room, sterile technique can be practiced exactly. The following three rules are the basis of the sterile technique.

a. An article is either sterile or contaminated.

b. A sterile article that has been touched by a contaminated article is no longer sterile.

c. Any sterile article that has become unintentionally wet or damp is no longer sterile.

3-2. BASIC STEPS IN STERILE TECHNIQUE

a. Set up for, assist with, and perform sterile procedures in a clean environment.

b. Wash hands thoroughly before beginning any sterile procedure.

c. Use only sterile supplies.

d. Keep unused sterile equipment sterile during preparation for and while performing the procedure. An object or surface is sterile when it has been made free from all living microorganisms by one of the processes of sterilization.

3-3. CREATING A STERILE FIELD

A sterile field is a work surface area prepared to hold sterile equipment during a sterile technique procedure. The sterile field provides an area in which sterility is continually maintained. The procedures for establishing a sterile field are given below.

a. Obtain the necessary equipment and supplies. All articles required for the procedure, which will be within the sterile field must be sterile.

b. Perform patient care handwash.

c. Locate a suitable surface. Set up the field on a surface that is clean, flat, dry, and free from drafts.

d. Create a sterile field using one of the two methods given below.

(1) Preferred method. The preferred method is to use a double-wrapped sterile package. Do not let your hands pass over the sterile field or the wrapped sterile object while you are establishing the field.

(a) Lay the package so that the flaps are on top (figure 3-1).

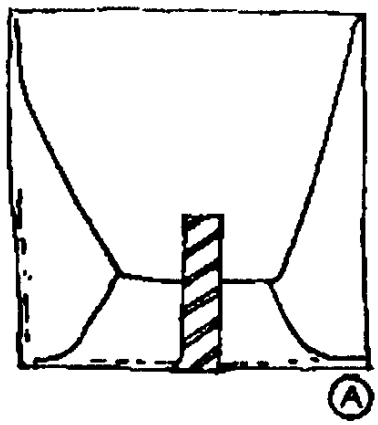

Figure 3-1. Flaps on top.

(b) Open the outer layer, usually a paper or plastic cover. This layer forms a barrier between the work surface and the inner wrapper.

(c) Open the inner wrapper.

1 Using one hand lift the distal flap up and away from the package (figure 3-2). Let this flap drop gently.

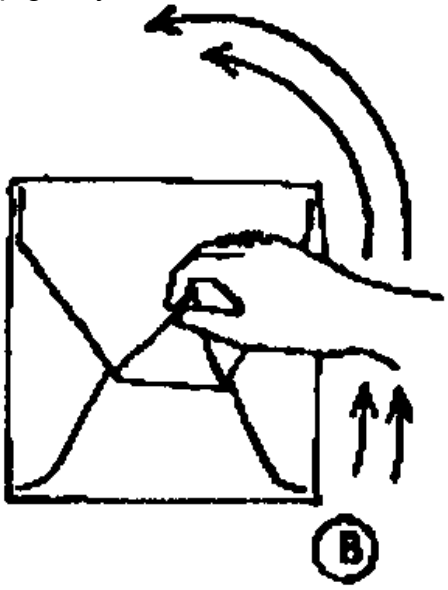

Figure 3-2. Distal flap.

2 Open the left flap (figure 3-3).

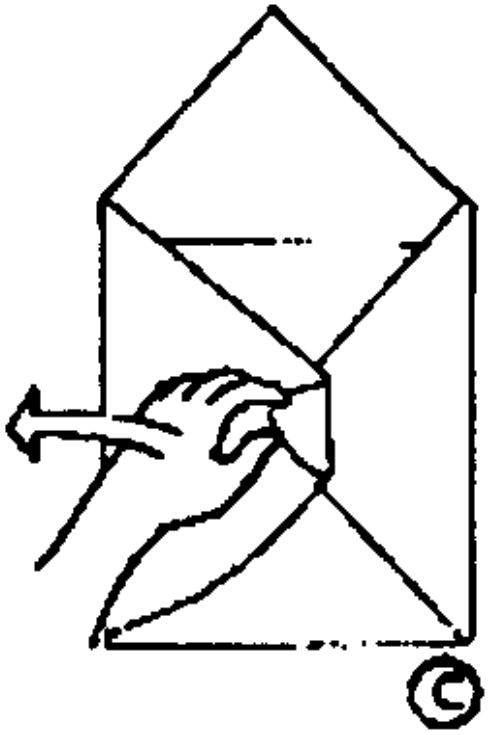

Figure 3-3. Left flap.

3 Open the right flap (figure 3-4).

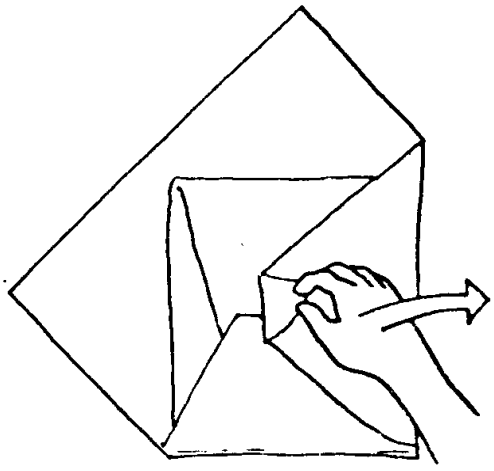

Figure 3-4. Right flap.

4 Then, open the near flap (figure 3-5).

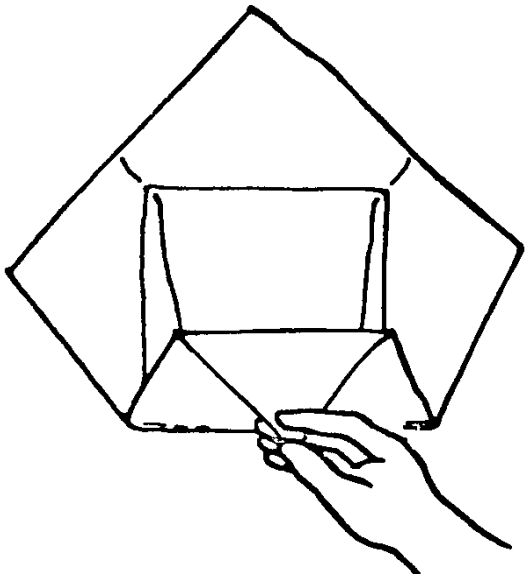

Figure 3-5. Near flap.

5 Open the wrapper so your hand and arm do not pass over any part of the inside of the wrapper that has been exposed.

(d) Use the inside of inner wrapper as the sterile field. The object that was wrapped is now located inside a sterile field and is removed from the sterile field using sterile technique.

(2) Alternate method. Obtain package of sterile drapes or towels. Create a sterile field by opening the sterile drapes or towels in the same manner as a double-wrapped sterile package. The inside of the sterile drapes or towels form the sterile field.

CAUTION: Do not contaminate sterile field by reaching over or across it. Talk only if necessary around a sterile field to prevent the spread of bacteria. Consider an article contaminated if you have doubts about its sterility.

3-4. ADDING STERILE OBJECTS TO A STERILE FIELD

Once the sterile field has been established, you may need to place other objects inside the sterile field. Follow these steps to add sterile items to a sterile field without contaminating the object or the field. The area within one inch of the edge of the wrapper is considered to be contaminated. A sterile article that touches this area is contaminated and should be discarded.

a. Hold the sterile package in one hand with the flaps up. This is done away from the sterile field.

b. Grasp the outside edges of the sterile wrapper with your free hand. This protects the sterility of package contents.

c. Unwrap the sterile package (figure 3-6). Be careful not to contaminate the inside of the wrapper or the sterile object.

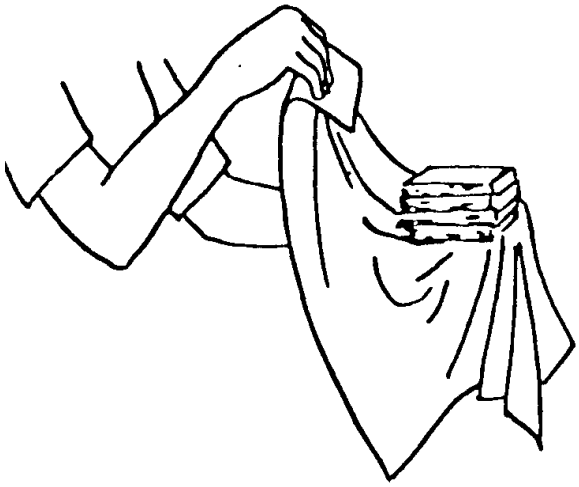

Figure 3-6. Open sterile package.

d. Hold edges of sterile wrapper back around your wrist (figure 3-7) so they will not accidentally drag across sterile field and so the hand supporting the sterile object is enclosed by the wrapper.

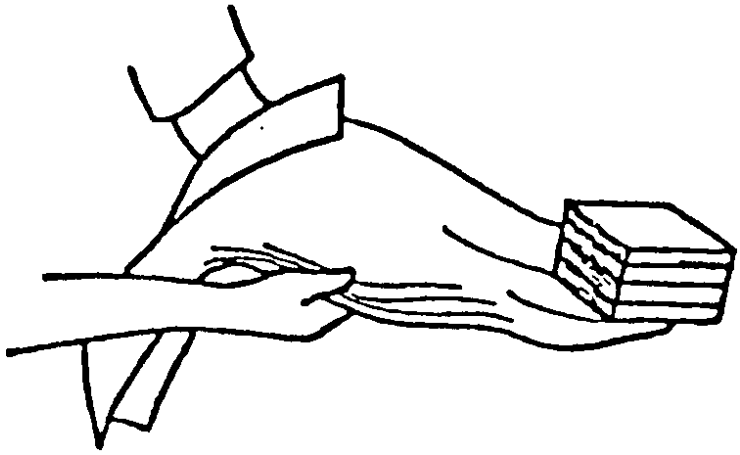

Figure 3-7. Hand enclosed by wrapper.

e. Drop small sterile items directly into the sterile field.

f. Place large items on the field using sterile gloves or sterile transfer forceps.

3-5. GIVING STERILE ITEMS TO ANOTHER WORKER

Open sterile packages without contaminating the contents. Hold the items so that a sterile worker can grasp item without contaminating himself or the item. Use the same procedures as given in paragraphs 3-4a through e.

3-6. OPENING AND POURING STERILE LIQUIDS

Sterile liquids are necessary for many procedures requiring sterile technique. Use the following procedures to open bottles containing a sterile liquid and to pour the liquids into a sterile container.

a. Lift or unscrew the cap. Do not touch bottle rim and inside cap, as these items are considered sterile. As you remove the cap, listen for a vacuum release sound. If there is no vacuum release sound, assume that the liquid is not sterile and get another bottle of the liquid to use instead.

b. Hold the cap in your hand or rest the cap upside down on table (not on sterile field since the outside of the cap is contaminated) so that the inside of the cap does not become contaminated. If the cap becomes contaminated, it cannot be used to reseal the bottle of sterile liquid and the left over portion of the sterile liquid must be discarded.

c. Glove your nondominant hand.

(1) Make sure glove package has not been contaminated (torn, and so forth) and that gloves are the proper size.

(2) Perform a patient care handwash, if you have not already done so.

(3) Place the package on a clean, dry surface.

(4) Peel back the outer wrapper.

(5) Remove the inner package and place it so that the end marked "cuff" is toward you.

(6) Grasp lower corner and open the package to a flat position.

(7) Grasp lower corners of the package and pull to the side in order to expose the cuffs.

(8) Grasp the cuff of the glove on the same side as your nondominate hand with your dominate hand. (figure 3-8).

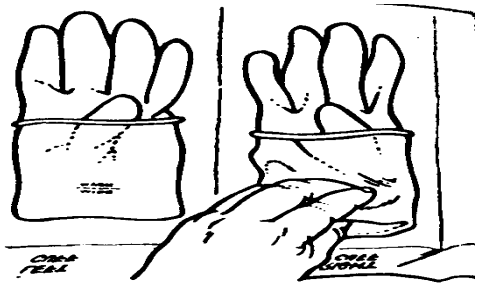

Figure 3-8. Grasp cuff.

(9) Remove the glove from the wrapper, step back, and insert your nondominate hand into the glove (figure 3-9).

Figure 3-9. Hand in glove.

d. Hold bottle in your ungloved hand with label against your palm. This protects the label from dripping solution. Also a clean label can be read easily.

e. If the bottle was opened previously, pour a small amount of liquid into a waste container, usually an emesis basin. Prepouring will cleanse the lid of the bottle. The container should not be inside the sterile field.

f. Pick up the container into which the liquid is to be poured with your gloved hand and step back from the sterile field. This is done to keep any liquid from dropping onto the sterile field. If a sterile field becomes wet, consider it to be contaminated.

g. Hold the bottle about 6 inches above the container into which the liquid is being poured and pour the liquid slowly in a steady stream into the sterile container. Pouring slowly in a steady stream avoids splashing.

(1) Do not touch the bottle lip against the container. If the lip of the bottle touches the container, the container will not be sterile.

(2) Do not allow the bottle to pass over the sterile field. If the bottle passes over any part of the sterile field, then that part of the field is considered contaminated, because a microscopic organism could have fallen from the bottle or your hand onto the field.

h. Replace the container onto the sterile field.

i. Replace the cap securely on the bottle. If the cap or rim of the bottle becomes contaminated, discard the bottle.

j. Remove the sterile glove by grasping the portion of the glove over the heel of the hand and pulling the glove off. Discard the glove in an appropriate container.

k. Write the date and time and your initials on the bottle label.

l. Return the bottle to the storage area. (**NOTE**: Local SOP may require that you discard the bottle rather than reusing it.) Vacuum-packed sterile liquids can normally be used for 24 hours if the bottle is resealed. If your ungloved hand or other contaminated object touches the neck of the bottle, inside the bottle cap, the bottle rim, or the lip of the cap, the rim or cap is considered contaminated and you must discard the bottle.

3-7. ASSISTING WITH THE WITHDRAWAL OF STERILE SOLUTION FROM A VIAL

Some sterile liquids that are used as medications for injection come in small bottles with rubber tops. These tops can be pierced with a sterile needle in order to withdraw the sterile contents. When performing this procedure, you will be assisting a physician or other medical personnel who is wearing sterile gloves and cannot touch the outside of the vial because the vial is contaminated. You, however, will not be gloved. Follow the procedures given below.

a. Obtain a correct vial of solution. Check the bottle against the physician's orders to verify that the solution is correct (correct name, dosage, and route).

b. Clean the vial stopper with an alcohol swab.

c. Hold the vial firmly with the label up so that the person with the sterile gloved hands can verify that the solution is the proper one. The gloved person then:

(1) Pulls the plunger of the syringe to the amount of solution required.

(2) Inserts the needle through center of rubber stopper.

(3) Pushes the plunger into the syringe to increase air pressure inside vial (figure 3-10).

Figure 3-10. Withdraw sterile fluid.

(4) Pulls plunger out to somewhat more than the prescribed level.

(5) Withdraws the needle with a quick straight pull. (If the needle touches the outside of the vial, then the needle is contaminated and the entire procedure must be done again.)

d. Discard or store vial in accordance with local SOP.

NOTE: Withdrawing fluid from an ampule is accomplished in basically the same manner.

3-8. NOTIFYING PERSONNEL THAT STERILE FIELD IS CONTAMINATED

Any individual who observes the contamination of the sterile field, regardless of rank or position, must immediately notify all individuals performing the procedure that the sterile field is contaminated and how the contamination occurred.

Continue with Exercises

EXERCISES, LESSON 3

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise. After you have completed all of these exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. Sterile technique is to be used in any procedure involving:

   a. An open wound.

   b. Entering a sterile body cavity.

   c. Cutting or puncturing the skin.

   d. Choices a and c.

   e. Choices a, b, and c.

2. Which one of the following is <u>not</u> one of the basic steps in sterile technique?

   a. Set up equipment in a sterile room.

   b. Wash your hands thoroughly before beginning a sterile procedure.

   c. Keep sterile objects sterile while preparing for a sterile procedure.

3. The sterile field should be established on a field that is:

   a. Clean.

   b. Dry.

   c. Flat.

   d. Free from drafts.

   e. Choices a, b, and c above.

   f. Choices a, b, c, and d above.

4. The preferred method for creating a sterile field involves:

   a. Wiping a clean table with sterile povidone-iodine solution.

   b. Wiping a clean table with 70 percent isopropyl alcohol.

   c. Opening a double-wrapped sterile package on a table.

   d. Covering a table with sterile drapes.

5. You have created a sterile field using the inside wrapper of a double-wrapped sterile package. What are the boundaries of the area that is considered to be sterile?

   a. The edge of the sterile wrapper.

   b. One inch beyond the edges of the sterile inside wrapper.

   c. One inch inside the edges of the sterile inside wrapper.

6. Which one of the following is <u>not</u> a rule for opening a sterile liquid when a sterile field is in use?

   a. Do not touch the inside of the cap.

   b. Place the cap upside down on the sterile field.

   c. Do not touch the rim of the bottle.

   d. Listen for a vacuum sound when opening the bottle.

7. You are assisting a person who is sterile to withdraw sterile medication into a sterile needle and syringe. Your job will be to hold the:

   a. Bottle of medication.

   b. Needle and syringe.

   c. Patient's skin taut.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 3

1. e (para 3-1)
2. a (para 3-2a)
3. f (para 3-3c)
4. c (para 3-3d(1))
5. c (para 3-4, fig. 3-2)
6. b (para 3-6b)
7. a (para 3-7)

End of Lesson 3

LESSON ASSIGNMENT

LESSON 4	Procedures Used in Wound Care.
LESSON ASSIGNMENT	Paragraphs 4-1 through 4-14.
TASKS TAUGHT	081-833-0010, Change a Sterile Dressing. 081-833-0012, Perform a Wound Irrigation. 081-833-0023, Prepare an Area for Operative Treatment.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

4-1. Identify the purposes of the sterile dressing.

4-2. Determine when a dressing may be changed or reinforced.

4-3. Identify the common types of dressings, bandages, and tapes.

4-4. Identify the steps for changing a sterile dressing.

4-5. Identify the procedures for cleaning a linear wound and a circular wound.

4-6. Identify the procedures for irrigating a wound.

4-7. Identify the procedures for preparing a wound for operative treatment.

SUGGESTION After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you achieve the lesson objectives.

LESSON 4

PROCEDURES USED IN WOUND CARE

Section I. CHANGING A STERILE DRESSING

4-1. PURPOSE OF DRESSINGS

a. A dressing is any sterile material used to cover a wound. A sterile dressing is used to:

(1) Protect the wound from bacteria in the environment.

(2) Protect the environment from bacteria in the wound.

(3) Absorb drainage.

b. A well-applied dressing makes the patient feel like he is receiving good health care. Psychologically, this makes the patient feel better.

4-2. DRESSING MATERIALS

Various types of dressing materials can be used when applying or changing a dressing. The following are those most frequently used.

a. **Coarse Mesh Gauze Sponge.** Coarse mesh gauze sponge (figure 4-1) is commonly used as an intermediate layer in many dressings. It is available in several sizes, but the ones used routinely are 2 x 2 inches, 4 x 4 inches, and 4 x 8 inches.

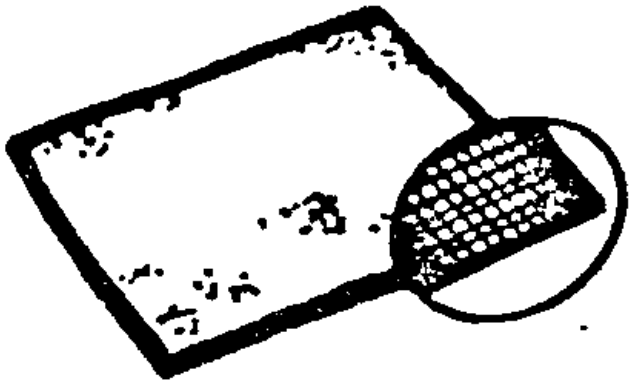

Figure 4-1. Mesh gauze.

b. **Abdominal Pad.** The abdominal (ABD) pad (figure 4-2) is a large, thick, multilayered absorbent dressing. It is used as an intermediate layer in many dressings. It is primarily used for postoperative abdominal incisions.

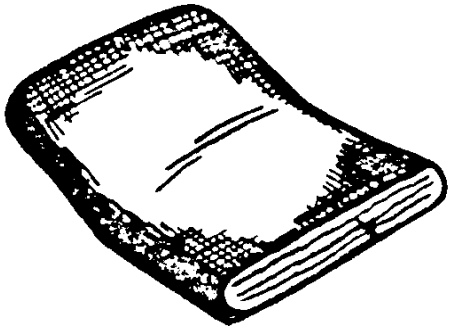

Figure 4-2. Abdominal pad.

c. **Telfa Pad.** The Telfa pad (figure 4-3) is a pad with a plastic-like coating on one side of gauze dressing which prevents the dressing from sticking to the wound.

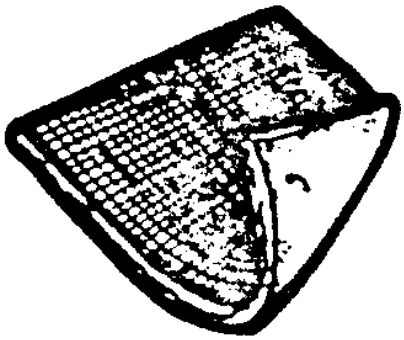

Figure 4-3. Telfa pad.

d. **Petrolatum (Vaseline) Gauze.** The petrolatum gauze (figure 4-4) consists of gauze coated with petroleum jelly. It is used to protect tissue from drying, to prevent adherence to the wound, and to create an airtight seal.

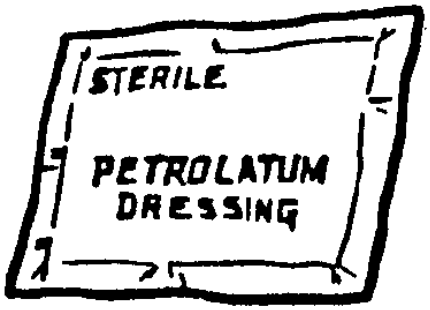

Figure 4-4. Petrolatum dressing.

4-3. BANDAGES AND TAPES

The dressing is normally secured by a bandage. In some situations, though, tape is used to keep the dressing over the wound. Bandages can also be used to wrap and protect a body part even if no separate dressing material is used.

a. **Bandages.**

(1) Kling or Kerlix bandage. Kling and Kerlix bandages are loosely woven or knitted roller gauze bandages that are soft and conform easily. This bandage is highly absorptive and is appropriate when a bulky dressing is needed.

(2) Elastic bandage. Elastic bandages are made from woven material that can be stretched and molded around the body part. If a sterile bandage is not required, an elastic bandage can be reused on the same patient.

(3) Roller gauze bandage. Roller gauze bandages are made from loose mesh material. They are available in various widths from 1 to 4 inches and are usually 5 yards long.

b. **Tapes.**

(1) Adhesive tape. Adhesive tape is made from cotton, cloth, paper, or foam. It is available in several widths. In addition to being used to secure dressings, the adhesive tapes are used to secure splints, immobilize various parts of the body, and to strap joints to prevent or treat athletic injuries. An adhesive solvent is used to remove any adhesive that sticks to the skin around the wound when the tape is removed.

(2) Hypoallergenic tape. Hypoallergenic tape is made from paper and is porous to allow air exchange.

(3) Plastic tape. Plastic tape is transparent and porous to allow air exchange.

4-4. REQUIREMENT TO CHANGE OR REINFORCE A DRESSING

a. The physician or the supervisor orders when the dressing will be applied and how often the dressing will be changed. The order will also specify if the wound is to be cleaned.

b. Under field conditions, in the absence of a physician's or supervisor's order, the medical specialist assumes the responsibility for changing a dressing.

c. Sometimes a dressing may need changing because it is soaked with seepage from the wound. If the circumstances or the physician's or supervisor's order prohibits the change, reinforce the area by covering it with another dressing. Label it "reinforcement" and write the date, time, and your initials on it.

4-5. REMOVING A SOILED DRESSING

Incisions and wounds that have been sutured will normally have two layers of dressing. One layer consists of gauze pads laid directly over the closed cut. A larger dressing will then be placed over the gauze pads. This second (outer) dressing covers more area than the inner dressing (gauze pads). If the wound is on the arm or leg, the dressings are normally secured with a bandage. If the wound is on the trunk of the body, such as an abdominal wound, the outer dressing is normally secured by tape. In the following example, the sterile dressing being changed covers an abdominal wound.

a. **Verify Patient's Identity.** Make sure that the patient whose dressing is to be changed is the patient for whom the action was ordered. Ask the patient his name. Also compare the patient's name on the orders with the name listed on the patient's bed card and identification bracelet.

b. **Reassure the Patient.** Provide privacy if possible by placing a screen or curtain around the patient or by closing the door. Gain the patient's help and confidence by telling him why you are changing the dressing.

c. **Wash Hands.** Perform a patient care handwash. Handwashing may not always be possible in a field situation; however, every effort should be made to provide handwashing facilities.

d. **Obtain Necessary Equipment and Supplies.** The following items are normally used.

(1) Dressings--4-in x 4-in (10-cm x 10-cm) and 4-in x 8-in (10-cm x 20-cm) sponges.

(2) Gauze pads (sponges).

(3) Cotton-tipped applicators gauze pads may be used instead.

(4) Tape.

(5) Adhesive solvent.

(6) Basins for adhesive solvent and for normal saline.

(7) Sterile towels (for sterile field).

(8) Gloves.

(9) Scissors.

(10) Sterile forceps.

(11) Saline solution.

(12) Solution basin, if applicable.

(13) Drain, if applicable.

e. **Prepare the Patient.** Position the patient so that the wound site is easily accessible. Expose the wound area by removing the patient's clothing and/or by folding the bed linens, gown, or pajamas away from the wound area. Do not expose any more of the patient's body than is necessary.

f. **Prepare the Work Area.**

(1) Clear all items off the bedside stand or the over-the-bed table.

(2) Clean and dry area where the sterile field will be established if needed.

(3) Cut the tape strips to the size that is required to secure the dressing.

(4) Attach one end of each tape strip to an area that can be easily reached.

(5) Pour adhesive solvent into the solvent basin.

(6) Pour the disinfecting solution into a solution basin.

(7) Put on mask and sterile gloves.

g. **Remove 0uter Dressing.** Do not put pressure on the wound when removing the dressings. Pressure causes pain, additional injury, and interferes with the healing process.

(1) Loosen the ends of the tape attached to the patient's skin (figure 4-5).

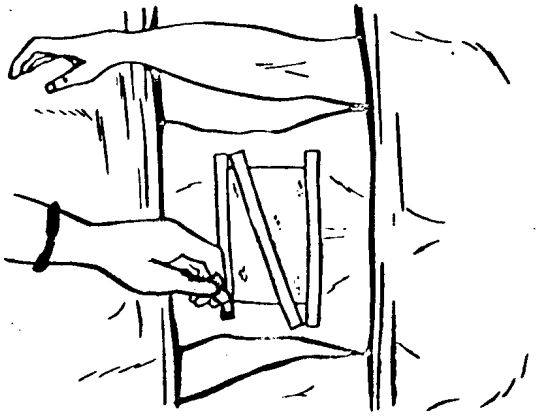

Figure 4-5. Removing tape.

(2) Peel ends toward the wound while holding the skin with the other hand. Do not remove tape in a direction away from the wound. If you peel going away from the outer dressing, you will create tension on the wound, which may disrupt the scab or tear the skin.

(3) Once the tape has been separated from the skin, remove the dressings.

(4) Check the dressings for odor, discoloration, and drainage.

(5) Discard the outer dressing in a contaminated waste container.

h. **Prepare to Remove Inner Dressings.**

(1) Wash your hands.

(2) Unfold the sterile towels so as to create a sterile field.

(3) Put on sterile gloves and mask.

i. **Remove Inner Dressings.**

(1) Grasp the edge of the top inner dressing with the forceps and gently roll the dressing off the wound.

(a) Point the tips of the forceps downward.

(b) If the dressing sticks to the wound, moisten the dressing with sterile water to soften surface of wound. If moistening the dressing does not loosen the dressing, check with your supervisor.

(2) Check the dressings for odor, color, and drainage. Report any abnormal wound drainage to your supervisor.

(3) Discard the dressing into a contaminated waste container without touching the contaminated side of the dressing to yourself or to any surface.

(4) Continue until all of the inner dressings have been removed and discarded.

(5) Drop forceps onto the glove wrap.

j. **Remove the Adhesive.** Gently rub a solvent-soaked cotton-tipped applicator or gauze pad over the adhesive around the wound. Removing the adhesive that sticks to the skin reduces the chance for skin breakdown (irritation) and adds to the patient's comfort.

k. **Observe Skin and Wound Site.** Observe the skin for signs of irritation (redness, rash, and/or swelling). Inspect the wound for:

(1) Redness.

(2) Swelling.

(3) Pus (usually yellow fluid; may be blood-tinged, greenish, or brown).

(4) Putrid (bad) odor.

(5) Unusual color.

(6) Condition of suture (joining of edges of wound).

(7) Condition of drains.

(8) Healing.

4-6. CLEANSING A WOUND

Cleanse the wound if order indicates. Dip each cotton-tipped applicator or gauze sponge into a saline solution before using it to clean the wound. The cleansing strokes are different for linear wounds than for circular wounds.

a. **Cleansing a Linear Wound.** The steps for cleansing a linear wound are shown in figure 4-6.

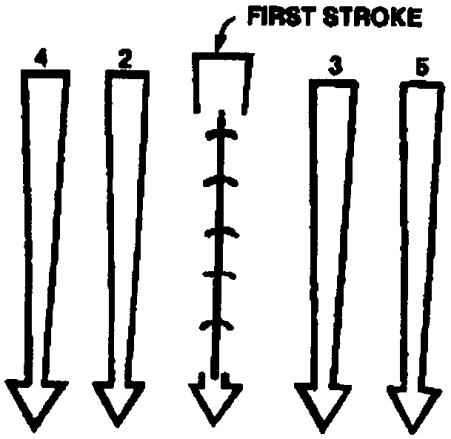

Figure 4-6. Linear wound.

(1) Stroke 1. Swab (wipe) the area directly over the wound with a single stroke. Discard the applicator (sponge) into the container for contaminated wastes.

(2) Stroke 2. On the patient's right side, swab (wipe) the area next to the wound with a single stroke. Discard the applicator (sponge).

(3) Stroke 3. On the patient's left side, swab (wipe) the area next to the wound with a single stroke. Discard the applicator (sponge).

(4) Stroke 4. On the patient's right side, swab (wipe) the area next to the second stroke with a single stroke. Discard the applicator (sponge).

(5) Stroke 5. On the patient's left side, swab (wipe) the area next to the third stroke with a single stroke. Discard the applicator (sponge).

b. **Cleansing a Circular Wound.** Steps for cleansing a circular or puncture wound are illustrated in figure 4-7.

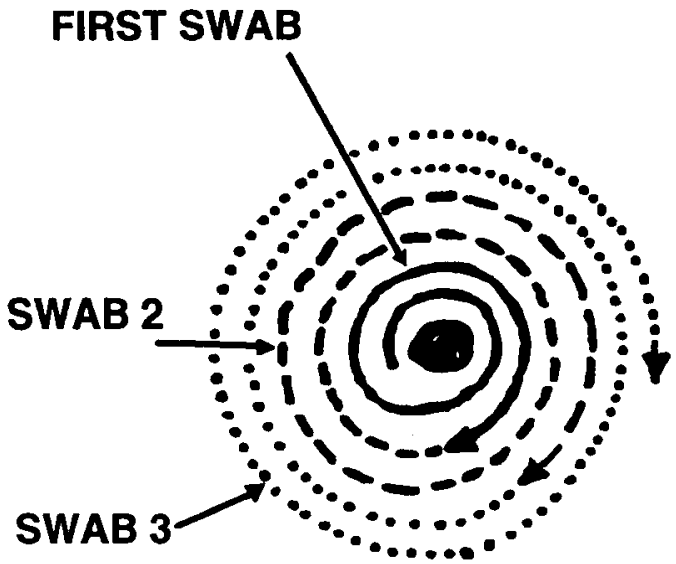

Figure 4-7. Puncture wound.

(1) Stroke 1. Starting at the center of the wound, swab the area in an outward circular spiral. Then discard the applicator (sponge).

(2) Stroke 2. From the spot where the first stroke ended, continue swabbing (wiping) in an outward circular pattern for about one and one-half revolutions. Then discard the applicator (sponge).

(3) Stroke 3. From the spot where the second stroke ended, continue swabbing (wiping) in an outward circular pattern for about one and one-half revolutions. Then discard the applicator (sponge).

(4) Stroke 4. From the spot where the third stroke ended, continue swabbing (wiping) in an outward circular pattern for about one and one-half revolutions. Then discard the applicator (sponge). Continue cleaning the area, if needed, until the area around the wound has been cleansed.

4-7. PROCEDURES FOR APPLYING A STERILE DRESSING

a. **Change Gloves or Forceps.** If you are using the sterile gloves and forceps and your gloves have not been contaminated by the wound, use a new sterile forceps. If you are not using a forceps or if your gloves have been contaminated by contact with the drainage from the wound, remove your gloves and put on new sterile gloves.

b. **Dry the Wound.** Pat the wound dry with sterile gauze sponges.

(1) Start at the center of the wound.

(2) Move outward toward the wound edges.

c. **Apply a Sterile Inner Dressing**. The number of gauze pads used may vary depending upon the wound.

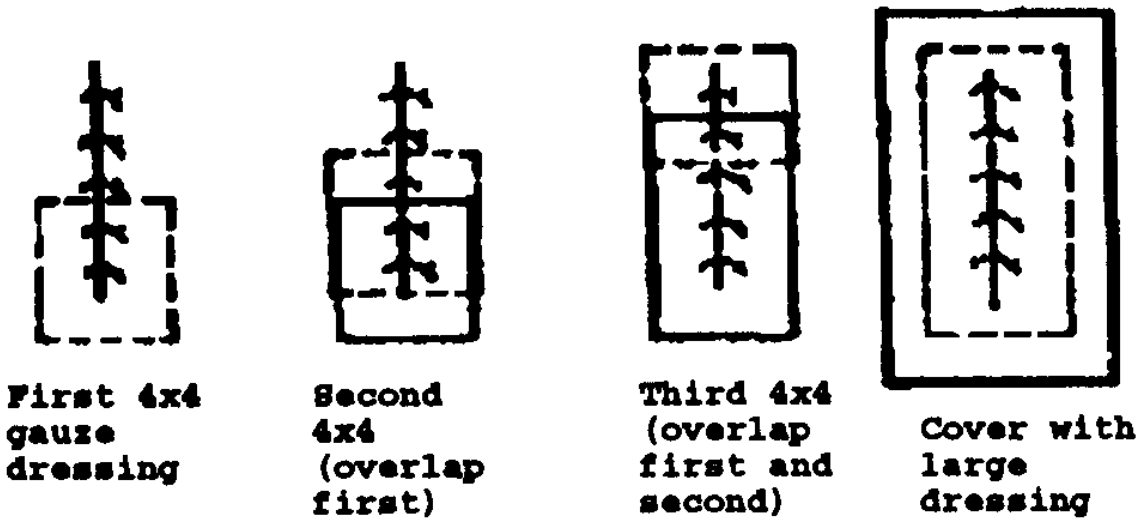

Figure 4-8. Apply a sterile dressing.

(1) Lay a sterile 4 x 4 gauze dressing over the lower part of the wound (figure 4-8, first).

(2) Overlap the first dressing with a second dressing (figure 4-8, second).

(3) Overlap the second dressing with a third dressing (figure 4-8, third).

c. **Apply Outer Dressing.** Completely overlap all the inner gauze dressings with a large outer dressing (figure 4-8, large). If a drain is in place, cut one of the dressing squares halfway through and position it around the drain (figure 4-9).

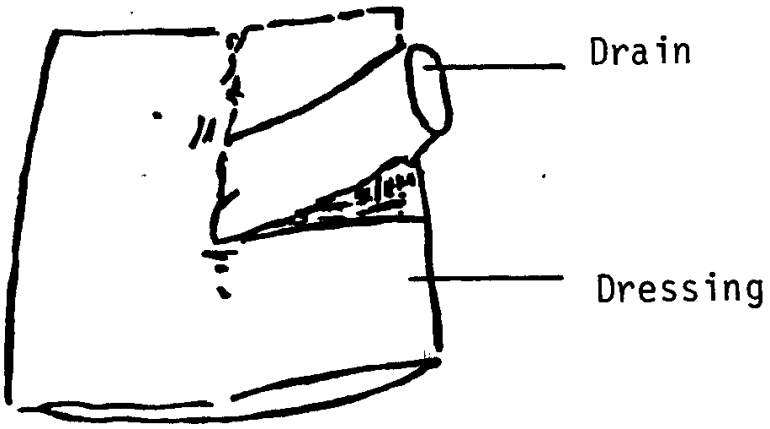

Figure 4-9. Apply a sterile dressing around a drain.

d. **Secure Outer Dressing.**

(1) Remove your gloves and mask.

(2) Place a strip of tape diagonally across the outer dressing so that both ends of the tape are anchored to the skin.

(3) Place a strip of tape along one of the long edges of the dressing so that both ends of the tape are anchored to the skin and the rest of the strip is half on the dressing and half on the skin.

(4) Place a strip of tape on the opposite long edge using the same procedure. (Finished product will resemble that shown in figure 4-5.)

(5) Make sure that the dressing is secure, but is not constricting blood flow below the dressing.

(6) Write the date and time the dressing was changed on one of the tape strips and initial it.

4-8. FINAL PROCEDURES

a. Remove and discard contaminated materials according to the local SOP.

b. Perform a patient care handwash.

c. Tell the supervisor that the dressing has been changed. Report the appearance of the wound, the amount and description of drainage, and any other observations made during the procedure.

d. Record the following data on the patient's records or other form as appropriate.

(1) Date of dressing change.

(2) Time of dressing change.

(3) Appearance of wound before cleansing.

(4) Appearance of wound after cleansing.

(5) Amount of drainage.

(6) Characteristics of wound and drainage.

e. Submit the report according to the local SOP.

Section II. WOUND IRRIGATION

4-9. PURPOSE

A wound irrigation (washing) can be performed to clean a wound. This cleaning process uses large amounts of fluid to remove secretions, clots, foreign matter, or microorganisms from the wound site. Irrigation is also used to instill medication in a wound. A wound irrigation can be used to both clean the wound and to instill medication at the same time.

4-10. PROCEDURE FOR IRRIGATING A WOUND

This section gives the procedures for performing a routine wound irrigation using sterile techniques. Irrigation of a wound prior to an operative treatment is discussed in section III.

a. **Verify Wound Irrigation Order.** Check the Doctor's Orders, Therapeutic Documentation Care Plan, or check with the supervisor to ensure that a wound irrigation is to be performed. Your instructions will specify the type and amount of solution to be used to irrigate the wound.

b. **Wash Hands.** Perform a patient care handwash.

c. **Assemble Equipment and Supplies.**

(1) Asepto (bulb-ended) syringe (300 to 500 ml) (figure 4-10). If asepto syringe is not available, use the largest regular syringe stocked.

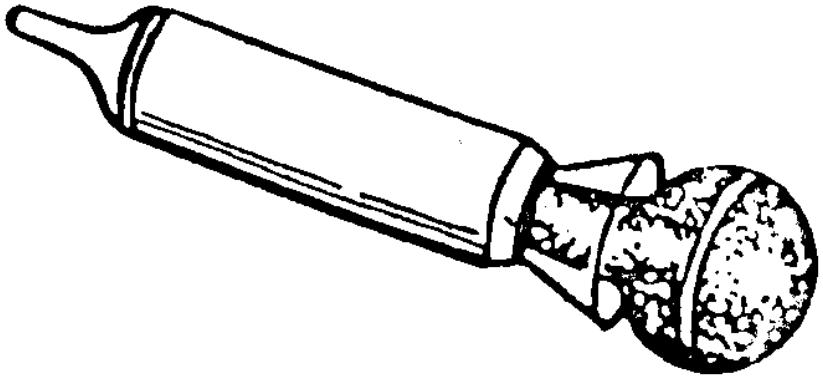

Figure 4-10. Asepto syringe.

(2) Prescribed irrigating solution (normal saline is usually the preferred irrigation solution).

(3) Emesis basin.

(4) Sterile gloves.

(5) Mask, if needed.

(6) Sterile dressings.

(7) Sterile 4 x 8-inch gauze sponges.

(8) Sterile solution basin.

(9) Protective pad (bedcover).

d. **Identify the Patient.** Ask the patient his name and check the patient's identification bracelet, bedcard, or other identification. This is done to ensure that you perform the procedure on the correct patient.

e. **Explain the Procedure to the Patient.** Simply tell the patient what you are going to do and why.

f. **Provide Privacy.** Place a screen or curtain around the patient, or close the door if the patient is in a room.

g. **Position the Patient.** Place the patient in a position that provides for maximum exposure of the wound without causing unnecessary exposure of the patient's body. Make sure that there is adequate lighting of the wound area.

h. **Position the Protective Pad.** Assist the patient, as necessary, to raise his body. Place protective pad directly under the wound. The pad will protect the bedding. After the pad is in place, assist the patient to return to the desired position.

i. **Mask, If Needed.** A mask may be needed to protect the wound from contamination by microorganisms from your respiratory system. Once you have begun the irrigation, do not touch or adjust your mask since this action could transfer microorganisms from you to the wound or from the wound to you. To don the mask, place the mask on your face and pull the elastic over your head.

j. **Remove Soiled Dressings, If Any.** See paragraphs 4-5f through k.

k. **Wash Hands.** Perform a patient care handwash.

l. **Prepare Irrigation Equipment.**

(1) Check to make sure that you are using the correct solution before you start. If you are using a standard sterile water solution or normal saline solution, check for the date and time on the bottle. Once opened, the water/saline is considered sterile for 24 hours. If the solution has been open for more than 24 hours, discard the solution and obtain another bottle. If you open a new bottle, write the date and time that it was opened on the label.

(2) Open the sterile solution basin on the bedside stand using sterile technique. The opened wrapper will be used as your sterile field.

(3) Pour the prescribed irrigation solution into the basin without contaminating the sterile field.

(4) Open container with the asepto syringe and place it on the sterile field using sterile technique.

(5) Open the 4 x 8-inch sponges, and place them on the sterile field using sterile technique.

(6) Put on the sterile gloves.

(7) Position the sterile solution basin on the sterile drape against the area of the body to be irrigated.

m. **Irrigate the Wound.**

(1) Position the emesis basin beneath the wound so that the solution used to irrigate the wound will drain into the basin.

(2) Using a 4 x 8 gauze sponge, pat the wound dry. Start at the center of the wound and move outward toward the edges. Then dispose of the pad.

(3) Fill the syringe with irrigating solution.

(a) Grasp the asepto syringe, depress the bulb, and insert the tip of the syringe into the irrigating solution. Release the bulb and allow the syringe to fill.

(b) If you are using a regular syringe, insert the end of the syringe into the irrigating solution and pull back on the plunger to aspirate the solution into the syringe.

(4) Hold the tip of the syringe as close to the wound as possible without touching it.

(5) Depress the bulb (plunger) of the syringe, and direct the flow of solution to all parts of the wound.

(a) Pay particular attention to areas with debris, sweat, and/or drainage.

(b) Take extra care when irrigating a wound in which an abscess has formed. An abscess is simply a localized collection of pus. If the pressure within an abscess goes unrelieved, it may cause a sinus tract (an opening between the abscess and body surfaces).

(6) Repeat the procedure until the debris, sweat, and/or drainage has been flushed out of the wound.

(7) Remove the emesis (catch) basin from under the wound.

(8) Pat the wound dry with sterile gauze sponges.

n. **Apply Sterile Dressing to Wound.** Follow the procedures given in paragraph 4-7.

o. **Perform Concluding Procedures.**

(1) Remove the protective pad from under the wound.

(2) Remove the mask and gloves.

(3) Place the patient in a position of comfort that he likes.

(4) Dispose of contaminated items, especially soiled dressings, in accordance with local policy.

(5) Clean and store nondisposable items.

(6) Wash your hands.

(7) Report accomplishment of the procedure and observations to your supervisor and record any necessary information.

Section III. PREPARING A WOUND FOR OPERATIVE TREATMENT

4-11. GENERAL

Most wounds will require sutures or some minor surgical procedure. The medical specialist is frequently called upon to prepare the wound area for the person performing the procedure. The general rules of medical and surgical asepsis must be followed to prevent infection, which could possibly cause loss of limb or life. The procedure for preparing an area for operative treatment is simple, but the consequences of an incorrect procedure could prove fatal.

4-12. PREPARE PATIENT AND MATERIALS

a. **Assemble Equipment and Supplies.** Obtain a sterilized prep set. Place set near work area so that it can be reached easily. The contents of the set may vary, but should include the following items:

(1) Sponge basin.

(2) Solution cup.

(3) Gauze pads.

(4) Asepto syringe.

(5) Safety razor and blade.

(6) Sterile water or sterile saline solution.

(7) Povidone-iodine (Betadine) solution.

(8) Protective pad (Chux if available).

(9) Sterile gloves in appropriate sizes.

(10) Basin (such as emesis basin).

b. **Prepare the Patient.**

(1) Explain procedure to the patient to ensure understanding and cooperation.

(2) Position patient as indicated by physician or supervisor.

(3) Place protective pad under area to be treated.

(4) Secure patient to table or litter by using litter straps or other suitable restraints, if needed.

(5) Provide privacy by closing the door, pulling the curtain, or screening the treatment area, if possible.

(6) Expose the site of the injury by removing or cutting away clothing, bandages, and dressings. Do not expose any more of the patient's body than is necessary.

(a) Use blunt-tipped bandage scissors to cut away clothing and bandages.

(b) If bandage or dressing is stuck, loosen it by moistening it with sterile saline.

(7) Focus light on area to be treated.

c. **Wash Hands.** Perform a patient care handwash.

d. **Prepare the Sterile Field.**

(1) Remove caps and stoppers from solution bottles.

(2) Open the prep set.

(a) Open outer wrapper with bare hands.

(b) Glove one hand and use that hand to open inner wrapper. Do not touch any unsterile item with gloved hand. Keep your gloved hand above work surface.

(c) Using your ungloved hand, pick up the sterile solution bottle and pour small amount of solution into a trash receptacle.

(d) Pick up the sterile basin with your gloved hand, step back from the sterile field, and pour the sterile solution into the basin. (The bottle is still held in the ungloved hand.)

(e) Return the basin to the sterile field and replace cap on bottle. (Use ungloved hand to replace cap.)

(f) Using your ungloved hand, pour povidone-iodine into solution cup (bottle held in ungloved hand); then replace cap.

(g) Glove bare hand.

4-13. PREPARE THE WOUND AREA

a. **Irrigate the Wound.** Irrigate (rinse) the wound using an asepto syringe and large amounts of saline solution. If saline solution is not available, use sterile water. Irrigation is usually performed under the direct supervision of a physician or other appropriate personnel. Bleeding may occur when the wound is irrigated as clots are dislodged and washed away.

(1) Position the basin under the wound area to catch the water.

(2) Fill the syringe with the sterile irrigating solution.

(3) Place the tip of the syringe as close to the wound as possible without touching the wound area.

(4) Depress the bulb and direct the fluid flow to all parts of the wound. Pay special attention to areas with debris, sweat, or drainage.

(5) Repeat the irrigation procedure until loose debris and drainage has been removed from the wound.

(6) Remove the basin.

b. **Cleanse the Area Around the Wound.**

(1) Place a sterile gauze pad over the wound and hold the pad in place.

(2) Cleanse the skin around the wound with gauze pads and povidone-iodine solution. Use gentle friction and circular motion. Begin working at the wound edges and clean outward until an area three to four inches from the edge of the wound has been cleansed.

(3) Discard the gauze pads after the area has been cleansed.

c. **Shave the Area Around the Wound**.

(1) Check with the physician, appropriate medical person, or SOP to determine the full area to be shaved.

(2) If a scalp or facial wound involving the hair, clip long, thick hair first; then shave. However, <u>do</u> <u>not</u> shave the eyebrows (cosmetic reasons).

(3) Shave any hair you can see at edges or in the cleansed area.

(a) Begin shaving at the edge of the wound.

(b) Shave outward from the wound edges.

(c) Apply tension by gently pulling skin taut.

(d) Use short strokes.

d. **Cleanse the Area Around the Wound.** Repeat the cleansing, using the same procedures given paragraph b. above.

e. **Rinse the Wound Area.** Rinse the area with sterile saline rinse. Rinsing removes loose hair from the skin and prevents hair from entering the wound.

f. **Dry the Wound Area.** Blot the skin dry with a fresh sterile gauze. Then place a sterile gauze over the wound.

g. **Notify Physician.** Notify the physician or other appropriate person that the wound area has been prepared.

4-14. FINAL PROCEDURES

a. Remove and discard your gloves.

b. Remove protective pad from under patient and discard. Be careful to not contaminate the clean area.

c. Discard all disposable items in contaminated waste container.

d. Clean and store nondisposable items according to the local SOP.

e. Perform a patient care handwash.

f. Record that the procedure was performed on the patient's Field Medical Card or Chronological Record of Medical Care, SF 600, as appropriate.

Continue with Exercises

EXERCISES, LESSON 4

INSTRUCTIONS: The following multiple-choice exercises are to be answered by writing the letter of the response that best answers the question or best completes the incomplete statement on a separate sheet of paper. After you have completed all of the lesson exercises, turn to "Solutions to Exercises" following the lesson exercises and check your answers.

1. A sterile dressing is used to:

   a. Protect the wound from bacteria in the environment.

   b. Protect the environment from bacteria in the wound.

   c. Both a and b.

2. Which one of the following is a dressing with a plastic-like coating on one side?

   a. Abdominal pad.

   b. Gauze sponge.

   c. Petrolatum gauze.

   d. Telfa pad.

3. You wish to use a tape to secure a dressing, which allows the skin beneath the tape to "breathe" (have air exchange). You can use:

   a. Adhesive tape.

   b. Hypoallergenic tape.

   c. Plastic tape.

   d. Either hypoallergenic tape or plastic tape.

4. A wound can be irrigated in order to:

   a. Remove foreign matter.

   b. Remove bacteria.

   c. Instill medication.

   d. Choices a and b above.

   e. Choices a, b, and c above.

5. When preparing a wound for an operative treatment, you should cleanse the area around the wound with a povidone-iodine solution:

   a. Before you shave the area around the wound.

   b. After you shave the area around the wound.

   c. Both before and after you shave the area around the wound.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 4

1. c (para 4-1a)
2. d (para 4-2c)
3. d (paras 4-3b(2),(3))
4. e (para 4-9)
5. c (paras 4-13b,c,d)

End of Lesson 4

LESSON ASSIGNMENT

LESSON 5	Isolation.
LESSON ASSIGNMENT	Paragraphs 5-1 through 5-10.
LESSON OBJECTIVES	After completing this lesson, you should be able to:

5-l. Identify the purpose of isolation.

5-2. Identify the categories of isolation by name.

5-3. Identify the precautions used for each category of isolation.

5-4. Identify basic principles of isolation techniques including room facilities; use storage, and disposal of equipment and supplies; and the use of masks, gowns, and gloves by hospital personnel.

5-5. Identify the procedures for terminal cleaning of an isolation room.

SUGGESTION After studying the assignment, complete the exercises at the end of this lesson. These exercises will help you achieve the lesson objectives.

LESSON 5

ISOLATION

Section I. Types of Isolation

5-1. CATEGORIES OF ISOLATION

Isolation is the separation of a patient from contact with others in order to control the spread of an infectious or communicable disease. Patients are isolated according to the mode of transmission of the disease.

a. **Strict Isolation.** Strict isolation is used to prevent the transmission of all highly communicable diseases that are spread by both, contact or airborne routes of transmission. Examples of such diseases are chickenpox and rabies.

b. **Respiratory Isolation.** Respiratory isolation is used to prevent transmission of organisms by means of droplets that are sneezed or breathed into the environment. Examples of such diseases are influenza and tuberculosis.

c. **Protective Isolation.** Protective isolation is used to prevent contact between potentially pathogenic microorganisms and uninfected persons who have seriously impaired resistance. Patients with certain diseases, such as leukemia, who are on certain therapeutic regimens are significantly more susceptible to infections.

d. **Enteric Precautions.** Enteric precautions are used to control diseases that can be transmitted through direct or indirect oral contact with infected feces or contaminated articles. Transmission of infection depends on ingestion of the pathogen. Examples of diseases requiring enteric precautions are dysentery and hepatitis.

e. **Wound and Skin Precautions.** Wound and skin precautions are used to prevent the spread of microorganisms found in infected wounds (including burns and open sores) and contact with wounds and heavily contaminated articles. Conditions requiring these precautions include infected burns, infected wounds, and infections with large amounts of purulent discharge. Diseases that may require wound and skin precautions include herpes, impetigo, and ringworm.

f. **Blood Precautions.** Blood precautions are used to prevent acquisition of infection by patients and personnel from contact with blood or items contaminated with blood. Examples of diseases that require blood precautions (refer to Lesson 1) are HBV and HIV/AIDS.

g. **Discharge Precautions.**

(1) Secretion precautions-lesions. These precautions are used to prevent acquisition of infection by personnel and patients from direct contact with wounds and secretion-contaminated articles. Some examples of diseases requiring these precautions are conjunctivitis, gonorrhea, and syphilis.

(2) Secretion precautions-oral. These precautions are used to prevent acquisition of infection by personnel from direct contact with oral secretions. Some examples of diseases requiring these precautions are herpes areolas and scarlet fever.

(3) Excretion precautions. These precautions are used to prevent acquisition of infection by personnel and patients from direct contact with fecal excretions. Some examples of diseases requiring these precautions are poliomyelitis and staphylococcal food poisoning.

5-2. SIGNS USED TO IDENTIFY TYPES OF ISOLATION

Concise information on isolation in effect is put on signs placed on the door of the isolation room at eye level. Some hospital signs are disease specific, and other hospital signs are category specific. The sign is removed when isolation is no longer required. A checklist is also placed on the door. This list indicates whether masks, gowns, gloves, etc. are required for persons entering the room. Any other pertinent information is also on this sign.

a. **Strict Isolation.**

(1) Visitors must report to the nurses' station before entering the room.

(2) Door must be kept closed.

(3) Gowns must be worn by all persons entering the room.

(4) Masks must be worn by all persons entering the room.

(5) Hands must be washed on entering and leaving the room.

(6) Gloves must be worn by all persons entering the room.

(7) Articles must be discarded or wrapped before being sent to Central Supply for disinfection or sterilization.

b. **Respiratory Isolation.**

(1) Visitors must report to the nurses' station before entering the room.

(2) Door must be kept closed.

(3) Gowns are not necessary.

(4) Masks must be worn by any person entering the room unless that person is not susceptible to the disease.

(5) Hands must be washed on entering and leaving the room.

(6) Gloves are not necessary.

(7) Articles contaminated with secretions must be disinfected.

c. **Protective Isolation.**

(1) Visitors must report to the nurses' station before entering the room.

(2) Door must be kept closed.

(3) Gowns must be worn by all persons entering the room.

(4) Masks must be worn by all persons entering the room.

(5) Hands must be washed on entering and leaving the room.

(6) Gloves must be worn by all persons having direct contact with the patient.

(7) Articles must be handled according to local SOP.

d. **Enteric Precautions.**

(1) Visitors must report to the nurses' station before entering the room.

(2) Gowns must be worn by all persons having direct contact with the patient.

(3) Masks are not necessary.

(4) Gloves must be worn by all persons having direct contact with the patient or with articles contaminated with fecal material.

(5) Special precautions are necessary for articles contaminated with urine and feces. Articles must be disinfected or discarded.

e. **Wound and Skin Precautions.**

(1) Visitors must report to the nurses' station before entering the room.

(2) Gowns must be worn by all persons having direct contact with the infected wound.

(3) Masks are not necessary except during dressing changes.

(4) Gloves must be worn by all persons having direct contact with the infected area.

(5) Special precautions are necessary for instruments, dressings, and linens.

CAUTION: Only hospital personnel who have been vaccinated with poliomyelitis vaccine should have direct contact with patients who have active poliomyelitis.

Section II. ISOLATION TECHNIQUES

5-3. GENERAL

The basic purpose of isolation is to minimize the spread of communicable diseases. The physician determines whether or not isolation is needed. Once the need for isolation has been determined, the responsibility for maintaining good isolation techniques belongs to everyone involved--from the physician to housekeeping personnel to the patient himself. Care for the patient in isolation is basically the same as for other patients, but there is an increased emphasis on the principles of medical asepsis.

a. The needs of a patient in isolation should not be ignored just because of the isolation. The needs of the isolated patient are just as important as the needs of other patients.

b. The basic principles that apply to patients in isolation are discussed in the following paragraphs.

5-4. ROOM

A private room should contain hand washing, bathing, and connecting toilet facilities. Connecting toilet facilities make unnecessary the need for portable commodes or special transportation techniques for commodes, bedpans, and urinals. The implementation of isolation can be simplified if special rooms on one or more wards are available for isolation.

a. The room or area should have a minimum ventilation (supply and exhaust) of six air changes per hour. These areas should be constructed so that there is no cross-circulation or recirculation of air, unless passed through high-efficiency filters, between the isolation room and other sections of the hospital.

b. An anteroom between the room and the hall, especially for rooms housing patients in strict isolation or respiratory isolation, will help in maintaining these two categories of isolation by providing storage space for gowns, gloves, and masks. These anterooms also reduce the possibility of airborne spread of infectious agents from the

room into the corridor whenever the door of the isolation room is opened. The anteroom should be under slightly negative pressure with regard to the hall. It is preferable for the anteroom, as well as the isolation room, to have its own supply and exhaust for ventilated air.

c. The room design of many, especially older, hospitals may not allow for adequate control of air movement. Therefore, complete control of droplet nuclei and dust particles is not possible. If proper air-handling capabilities are lacking, a commercially available window fan to exhaust air from the room may be used to control airflow. It is far preferable, however, for the hospital to install permanent ventilation systems in an adequate number of rooms specified for isolation. Window fans might be installed in rooms of patients admitted with disease spread by the airborne route, such as staphylococcal pneumonia, or chickenpox. Window fans may be of special use in improving isolation of patients with pulmonary tuberculosis.

5-5. HOSPITAL PERSONNEL

a. **Masks.** Individual mask technique is recommended. Masks should cover the nose and mouth. The high-efficiency disposal masks are more effective than the standard cotton gauze or paper tissue masks in preventing airborne and droplet spread. Masks should be used only once. They may become ineffective when moist and should be discarded in an appropriate receptacle before the user leaves the contaminated area. Masks must never be lowered around the neck and reused. Supplies of masks should be readily available outside the patient area when isolation procedures require their use.

b. **Gowns.** Individual gown technique is recommended; that is, gowns should be used only once and then discarded in an appropriate receptacle before the user leaves the contaminated area. Supplies of gowns must be readily available outside the patient area when isolation procedures require their use. Sterile gowns may be used in caring for some patients in protective isolation. In other instances, such as patients with extensive burns or extensive wound infections, it may be desirable to use sterile gowns when changing dressings. Clean, freshly laundered, or disposable gowns may be used for all other categories.

c. **Caps and Booties.** Caps and booties are not necessary in any of the categories of isolation. When used, the cap should cover all scalp hair, and the booties should cover the open ends of trousers. They should be used only once and then packaged for reprocessing or disposal.

d. **Hands.** Hand washing before and after contact with each patient is the single most important means of preventing the spread of infection. Hand washing is mandatory even when gloves are used. In addition, personnel must wash their hands after any contact with excretions (feces, urine, or soiled material) or secretions (drainage from wounds, skin infections, and so forth) of the patient before touching that patient again.

(1) Liquid, powder, or bar soaps can be used for normal hand washing; however, an antiseptic cleansing agent should be used by personnel caring for patients in isolation. Vigorous scrubbing for at least 15 seconds and thorough rinsing are essential for hand washing to be effective since much of the benefit results from physical removal of contaminants.

(2) Sinks for hand washing and hand washing supplies should be conveniently available near every patient.

e. **Gloves.** Gloves should be used only once and then discarded into an appropriate receptacle before the user leaves the contaminated area. Supplies of gloves should be readily available outside the patient area when the isolation procedure requires their use. Disposable single-use gloves (sterile or nonsterile, depending on the specific use) are available and may be used.

(1) In administering to a patient, personnel should change to new gloves after direct contact with that patient's excretions or secretions, even if you have not completed your nursing care procedures for that patient.

(2) The use of gloves is stressed because even with good hand washing techniques, potentially infectious material may be left on the hands (under fingernails, for example). Such residue cannot be removed without special attention.

5-6. EQUIPMENT

a. **Sphygmomanometer and Stethoscope.** When indicated, this equipment should be kept in the isolation area for use with the patient throughout his hospitalization. After the patient is discharged, these instruments should be disinfected in the manner as appropriate based upon the type of agent that required the isolation.

b. **Needles and Syringes.** Because of the impossibility of knowing which patients' blood may be contaminated with hepatitis virus or other microorganisms, extreme caution must be applied in handling used needles and syringes whether in isolation or not.

(1) Disposable needles and syringes are available and should be used for patients in isolation. They must not be reused. Used needles need not be recapped; they should be placed in a prominently labeled, impervious, puncture-resistant container designated specifically for this purpose. Needles should not be purposely bent because accidental needle puncture may occur. Place used syringes in an impervious bag. Both of these containers should be incinerated or autoclaved and then discarded.

(2) Reusable needles and syringes should be rinsed thoroughly in cold water after use. The needle should be placed in a puncture-resistant rigid container. Syringes and needles should be wrapped using double-bag technique and returned for decontamination and sterilization.

c. **Urinals and Bedpans.** Urine and feces should be flushed down the toilet when the hospital uses a municipal or other safe sewage treatment system. A urinal and/or bedpan, if needed, should be issued to and used by only one patient until decontaminated and resterilized. Autoclaving is the most reliable decontamination system. Steam hoppers do not sterilize these utensils and may even create bacterial or viral aerosols. Disposable urinals and bedpans are available and may be used for patients in isolation. They should be disposed of in the same manner as dressings and paper tissues.

d. **Thermometers.** Special precautions with nondisposable thermometers are needed for certain categories of isolation. In these instances, the thermometer remains in the patient's room in a container with disinfectant prepared according to local SOP. Every three days, the disinfectant is flushed down the toilet and the container washed, dried, and refilled. Thermometers should be rinsed in cold water before and after use.

(1) Oral thermometers may be kept dry instead of soaking in a disinfectant solution. Before each use, however, they should be washed with soap and water and wiped with 70 to 90 percent alcohol.

(2) Upon discharge of the patient, nondisposable thermometers should be wrapped and sent to Central Supply for sterilization.

5-7. SUPPLIES AND OTHER ITEMS

a. **Dressings and Tissues.** All dressings, paper tissues, and other disposable items soiled by respiratory, oral, or wound secretions must be considered potentially infective and disposed of accordingly even if the patient is not isolated. Disposal may call for single or double disposable bag techniques. Bags should be impervious. When removed from patient areas, the bags should be closed, sealed, and placed in a larger disposable bag or container. Ultimate disposal is by incineration or placement in a properly supervised and maintained sanitary landfill. Appropriate disposable bags must always be available at the patient's bedside.

b. **Linen.** All mattresses and pillows for patients in isolation should be covered with impervious plastic. The double-bag technique discussed below should be used when removing linen and other contaminated articles from rooms of patients in isolation.

NOTE: If the inner bag is made of plastic that is hot water soluble, handling of these potentially contaminated linens is reduced. Disposable linens can be used for patients in isolation.

(1) The articles are placed in a clean bag in the contaminated area and closed tight.

(2) The bag is then placed in a second bag, preferably of a different color, which is held by a person or supported by a hamper outside the patient's room.

(3) This second bag is closed or stapled tight and labeled "*CONTAMINATED*" or "*ISOLATION*" so that whoever receives this material can take the necessary precautions to protect himself.

c. **Dishes.** Disposable dishes and utensils are available and can be used for patients in isolation.

d. **Drinking Water.** No special precautions are necessary.

e. **Clothing and Personal Effects.** Follow established special precautions in strict isolation, enteric precautions, and wound and skin precautions.

f. **Laboratory Specimens.** When double-bag technique is necessary for transporting specimens, use transparent bags so contents can be seen and handled appropriately.

g. **Books, Magazines, Money, Letters, and Toys.** In general, any of these articles visibly soiled with potentially infective excretions or secretions should be disinfected or destroyed.

h. **Patient's Chart.** The patient's chart should not be taken into the isolation room if the patient is under strict isolation.

5-8. CLEANING

a. **Concurrent Cleaning.** Cleaning equipment must be disinfected at the end of each cleaning shift. For example, wiping cloths and mop heads should be laundered and thoroughly dried, dirty water discarded, and buckets disinfected before being refilled.

b. **Terminal Cleaning.** Terminal cleaning of isolation rooms for isolation areas consists of the following general actions in addition to any specific measures listed in the individual section.

(1) All receptacles (drainage bottles, urinals, bedpans, flow meter jars, and thermometer holders) should be emptied, wrapped, or marked (if indicated), and returned to Central Supply.

(2) All disposable items should be discarded in a wastebasket lined with an impervious plastic bag.

(3) All equipment that cannot be best handled by Central Supply or discarded should be washed with a freshly prepared germicidal detergent solution.

(4) All furniture and mattress covers should be washed with the germicidal detergent solution. Furniture after terminal disinfection is illustrated in figure 5-1.

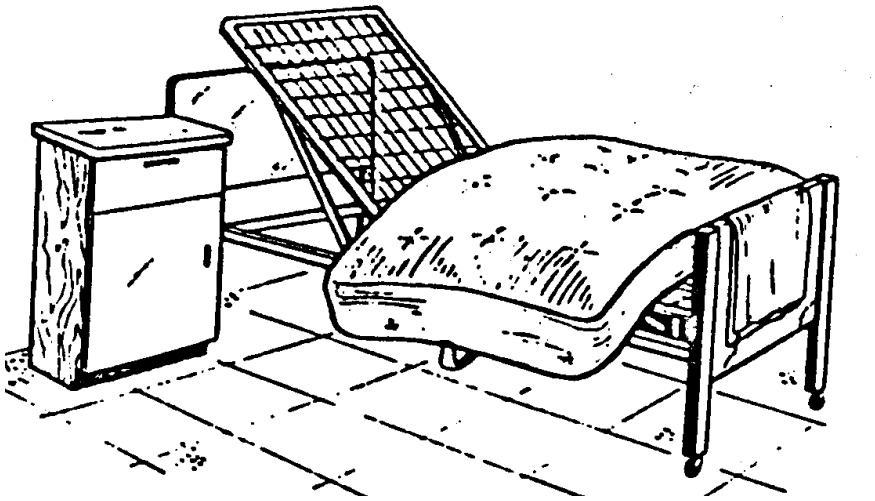

Figure 5-1. Furniture after disinfection.

(5) All floors should be wet-vacuumed. If wet-vacuuming equipment is not available, floors should be mopped with fresh germicidal detergent solution using a double-bucket technique.

(6) Grossly soiled areas on walls should be washed with germicidal detergent solution.

(7) Disinfectant fogging should not be used. It is an unsatisfactory method of decontaminating air or surfaces.

(8) Airing a room from which a patient has been discharged is not an effective terminal disinfection procedure and is not necessary. The only exception is that if the room does not have an adequate artificial ventilation system or functioning exhaust fan, a 1 to 2 hour airing period with windows open and doors closed may be used before terminal cleaning.

c. **Special Instruments.** If possible, instruments should be returned to be disinfected or sterilized. They should be either single or double-bagged and marked before they leave the patient's area. All reusable breathing circuits and humidification devices used with inhalation therapy equipment should be wrapped and returned to Central Supply for reprocessing.

d. **Special Procedure Trays.** Trays should be separated into component parts and handled as indicated.

e. **Isolation Carts.** Some institutions use special isolation carts prestocked with all necessary equipment for all classes of isolation or separate isolation carts for each class of isolation. These can be wheeled to the area where a patient in isolation is located. They must be cleaned frequently and kept adequately stocked with all necessary supplies.

5-9. VISITORS

Visitors should be kept to a minimum since they may become infected. In all instances, visitors should see a floor nurse before entering the isolation area and be instructed in the use of the gown, mask, and gloves. In general, children should not be allowed to visit patients in isolation.

5-10. TRANSPORTING PATIENTS

Patients should be taken out of their isolation area only for essential purposes. Appropriate barriers [masks and impervious
(water resistant) dressings] to prevent disease transmission should be provided for the entire period the patient is out of the isolation area. The area to which the patient is to be taken should be notified of his impending arrival and informed of the techniques to be applied to prevent the spread of infection. If appropriate, the patient should be alerted to the potential spread of his disease and informed as to how he can assist in maintaining a barrier against the transmission of his infection to others.

Continue with Exercises

EXERCISES, LESSON 5

INSTRUCTIONS: Answer the following exercises by marking the lettered response that best answers the exercise, by completing the incomplete statement, or by writing the answer in the space provided at the end of the exercise. After you have completed all of these exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers. For each exercise answered incorrectly, reread the material referenced with the solution.

1. The purpose of isolating a patient from other patients is to:

   a. Help prevent the spread of communicable disease.

   b. Control irrational outbursts on the part of the patient.

   c. Reduce the risk of psychological reactions on the part of fellow patients.

   d. Punish the patient.

2. Which of the following is a proper isolation technique?

   a. There should not be an anteroom between the isolation room and the hall.

   b. Ventilation of air within the room should be kept to under three air changes per 24-hour period.

   c. The use of portable commodes is preferred over private toilet facilities adjoining the isolation room.

   d. Window fans can be used to help control airflow in isolation rooms with inadequate ventilation.

3. In which of the following situations would you probably wear a sterile gown rather than a regular freshly laundered gown?

   a. Caring for a person in protective isolation.

   b. Caring for a person in respiratory isolation.

   c. Caring for a person in strict isolation.

4. You are giving care to a person in isolation. Your gloves have come into contact with drainage from a wound. Should you change your gloves before you continue to administer care to the patient?

   a. Yes.

   b. No.

5. Sheets (not disposable) from an isolation room are to be double-bagged. Which one of the following is preferred?

   a. The outer bag should be soluble in hot water.

   b. The inner bag should be soluble in hot water.

   c. Both bags should be soluble in hot water.

   d. Neither bag should be soluble in hot water.

6. Which one of the following is <u>not</u> part of the terminal cleaning procedures for an isolation room?

   a. Returning drainage bottles to Central Supply.

   b. Discarding all disposable items into a paper bag.

   c. Washing grossly soiled areas or walls with a germicidal detergent solution.

   d. Washing mattress covers with a germicidal detergent solution.

Check Your Answers on Next Page

SOLUTIONS TO EXERCISES, LESSON 5

1. a (paras 5-1, 5-3)
2. d (para 5-4c)
3. a (para 5-5b)
4. a (para 5-5e(1))
5. b (para 5-7b NOTE)
6. b (para 5-8b(2))

End of Lesson 5